

Delivery season

The U.S. Postal Service has deployed a massive VPN with the help of multiple outsource providers and strategic contract management. **PAGE 9.**

Clear Choice Test: Backup tools

We put nine backup and restore tools to the test and discovered that the entire class of products has gained sophistication. However, Symantec's Backup Exec stands out. **PAGE 26.**

Shiny, happy teleworkers

Companies are supporting clubs, social events and face-to-face meetings to keep telecommuters motivated and in the corporate loop. **PAGE 23.**

NETWORKWORLD

The leader in network knowledge ■ www.networkworld.com

December 18, 2006 ■ Volume 23, Number 49

④ WiderNet

The most colorful networking story ever

What's behind Big Blue, Red Hat and all of those purple Extreme Networks switches?

BY BOB BROWN

A quick study of the network industry could be enough to give you the blues.

To start, there's IBM, otherwise known as Big Blue. Then there's Windows' dreaded blue screen of death and Microsoft's annual BlueHat security briefings. And who can forget the Code Blue virus that struck in 2001? The industry's extended blue period has delivered wireless security company Blue-socket, plus other outfits of past and present, such as BlueCat Networks, Blue Ridge, Blue Titan and BlueWave Networks. North



COLIN JOHNSON

See Colors, page 16

Nortel: Why Cisco should be worried

It's been a little more than a year since Mike Zafirovski left Motorola to take the reins at Nortel. In that time he has remade top management, raised the profile of Nortel's enterprise busi-

Q&A



ness, focused product development, slashed costs, instituted quality and ethics principles, and established sales and profitability targets. Zafirovski shared his thoughts with Network World

Company planning to decouple router/switch software, hardware.

BY PHIL HOCHMUTH

SAN JOSE — Cisco over the next five years plans to radically change how it sells and delivers router and switch software, in part by making that software more virtualized and modular.

Cisco's intention is to decouple IOS software from the hardware it sells, which could let users add enhancements such as security or VoIP more quickly, without having to reinstall IOS images. The vendor also plans to virtualize many of its network services and applications, which currently are tied to hardware-specific modules or appliances.

This shift would make network gear operate more



Cisco's Cliff Metzler last week laid out the company's future router/switch software road map.

like a virtualized server, running multiple operating systems and applications on top of a VMware-like layer, as opposed to a router with a closed operating system in which applications are run on hardware-based blades and modules. Ultimately, these changes will make it less expensive to deploy and manage services that run on top of IP networks, such as security, VoIP and management features, Cisco says.

High-level details of the road map were delivered in a session at Cisco's C-Scape analyst conference last week in San Jose by Cliff Metzler, senior vice president of the company's Network Management Technology Group.

"The way we've sold software in the past is we've bolted it onto a piece of hardware, and we shipped [customers] the hardware," Metzler said. "We need

See Cisco, page 37

Mark your calendars: Shows to hit in 2007

BY CARA GARRETSON

There's a reason Comdex went away, and it wasn't overpriced Las Vegas hotel rooms.

Comdex, once the mother of all IT-related events, faded away after its last season in 2003, too big for its own good. Maybe showcasing padded laptop bags next to enterprise switches wasn't such a great idea after all.

Today the trend among industry events is toward focus; conferences such as the gadget-happy Consumer Electronics Show (CES) and network-centric

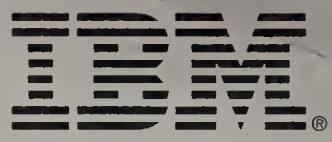


Interop exemplify that with a little bit of tailoring a trade show can offer real value. But, some would argue that as successful shows such as these grow in size they often lose the focus that made them worthwhile in the first place.

"The historical cycle in trade shows in the technology arena has been to bulk up as any given segment gets bigger," says Gary Bolles, co-founder of Conferenza, a blog that tracks executive conferences in technology. "As an industry matures there is still a need

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_INFRASTRUCTURE LOG

_DAY 25: They're in the cafeteria!! AAAGGGHHH!! These useless things can't work with each other. They aren't scalable. They aren't responsive. And you can't adjust new capacity on the fly. The horror.

_So many of them, I have to eat standing up. My arches are killing me. And I got avocado on my shirt.

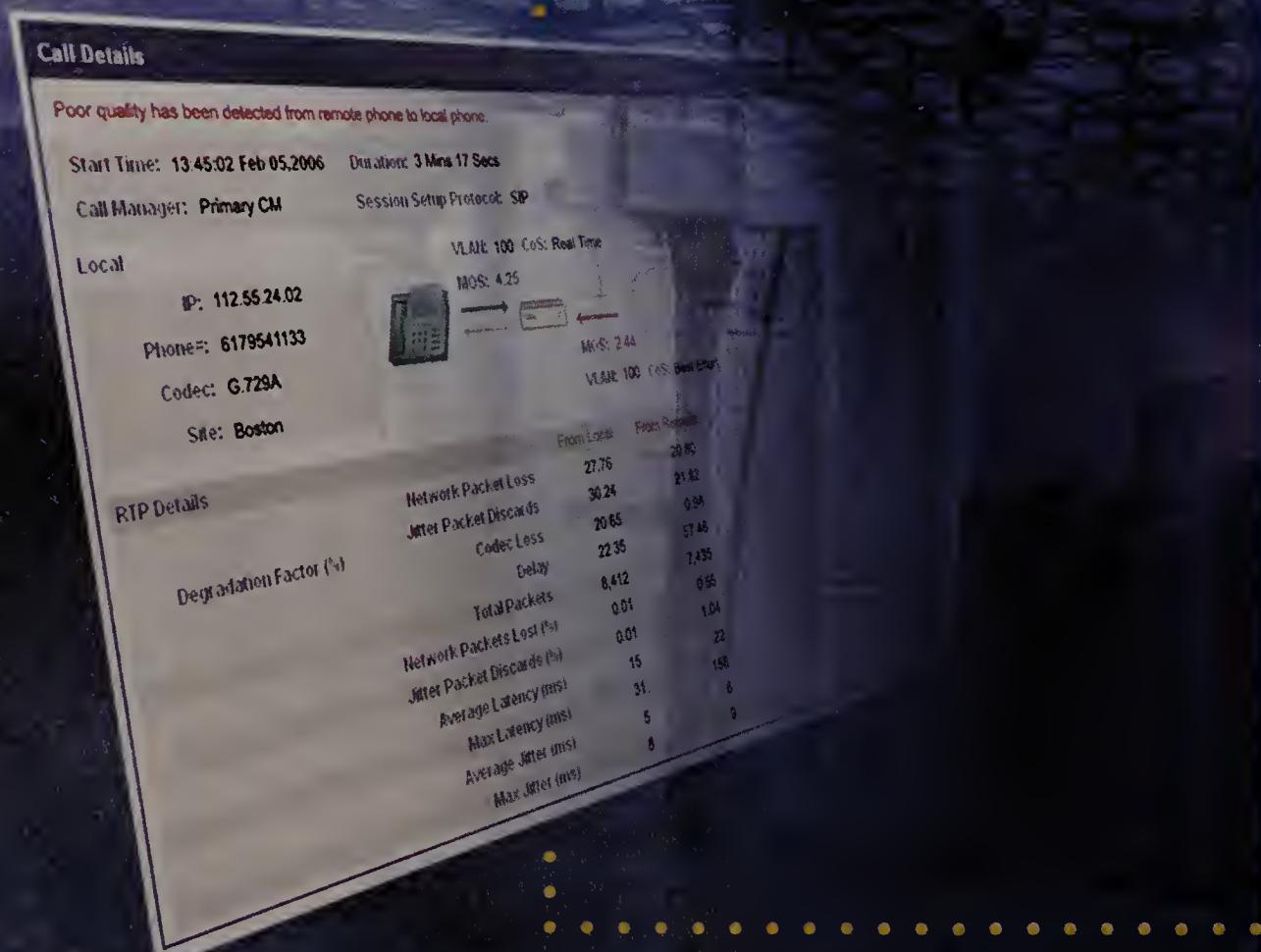
_DAY 26: The answer: IBM BladeCenter® with Dual-Core Intel® Xeon® Processors to boost performance and balance workloads. Its self-automating features make it easy to manage, and it has more blades per chassis for a smaller footprint. The BladeCenter even opened up its specs, so the things we buy today can work with the things we buy tomorrow.

_I can eat my turkey-avocado sandwiches in peace again. Mmmmm...



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Network Infrastructure

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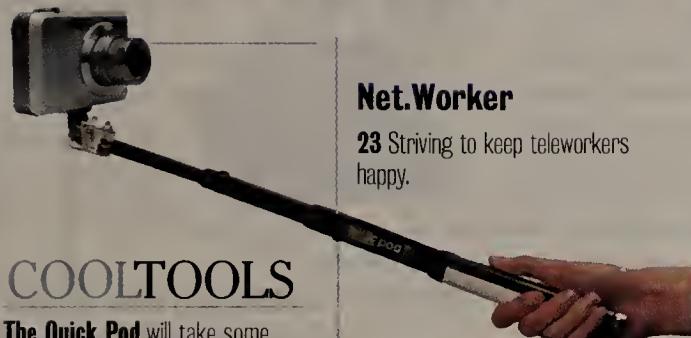
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9 'Tis the season for the Postal Service network to deliver.



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The Quick Pod will take some practice to take pictures of yourself by yourself. **Page 20.**

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What you should know about the documents a new employer may require you to sign.



Eric Mueller

7 Networkworld.com: Catch up on the latest online forums, blogs, newsletters, videos and help desk queries.

Newsbits

Microsoft updates Vista in piracy crackdown

■ Microsoft last week released an update to Windows Vista that will shut down unauthorized versions of the operating system that let users skip the product's activation system. The move comes as pirated copies of Vista are making the rounds, mere weeks after the product was released to business customers. The update, which Microsoft has dubbed "franken-build," detects tampering of Windows Vista code that would let users of the operating system work around the product's built-in activation system, which requires users to validate their copy of Vista with a product activation key to use the full version of the product after 30 days. Frankenbuild mixes files from various test and final versions of the software. It will require only systems in which it detects specific tampering to go through a validation check for authenticity, according to a posting on the Windows Genuine Advantage blog.

HP, Microsoft deal challenges IBM

■ HP is strengthening ties to Microsoft to provide a broadened portfolio of business software products to the enterprise market while delivering a competitive blow to rival IBM. HP and Microsoft last week announced a joint \$300 million three-year investment to sell five types of enterprise technology: Messaging and unified communications, including e-mail, instant messaging and video conferencing; collaboration and content management, software that lets geographically dispersed employees collaborate on text, database, video and other files; business intelligence, the analysis of data to help

drive business decisions; business process integration, which refers to the processes enterprises use to run their businesses; and core infrastructure, the management of an enterprise's computer systems. The collaboration will generate 30 new products and services in the next year to 20,000 shared customers of the two companies.

Al Shugart, disk-drive pioneer, dies

■ Al Shugart, founder of Seagate Technology and a pioneer in the disk-drive industry, died last week. He had had open-heart surgery six weeks ago at age 76. Shugart, a colorful person (and not only for his wildly patterned Hawaiian shirts), will be remembered

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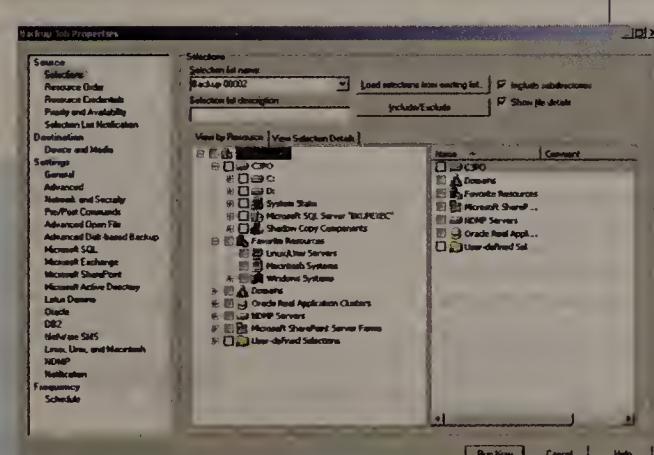
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NETWORKWORLD CLEAR CHOICE

We put nine backup-and-restore products to the test and discovered that the entire class of products has gained sophistication. However, Symantec's Backup Exec stands out as the best of the bunch. **Page 26.**

Clear Choice Test:

Identity Engines Ignition 3.2 is an appliance that is adept at central policy management. **Page 32.**



Newsbits

News Briefs

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as the founder of one of the largest disk-drive companies and for running his dog Ernest as a candidate for Congress. He wrote about the Bernese Mountain Dog's campaign in *Ernest Goes to Washington (Well, Not Exactly)*. Described as sometimes being gruff, Shugart was known at Seagate, which he founded in 1979, for grooming young executives. After a 1998 dispute with the board, Shugart was ousted. Reported nearly broke, Shugart moved to Santa Cruz, Calif., opened a bar, surfed, bought a fishing boat and founded a venture-capital firm, Al Shugart International, which funds entrepreneurs and small companies. After leaving Memorex in 1972, Shugart founded Shugart Associates, a developer of floppy disks used in PCs, and Shugart Technology. Shugart is also known for developing the SCSI interface in 1986.

Site to check Internet traffic pulse

■ A University of Minnesota researcher says he expects to unveil a Web site in the next few weeks designed to track Internet traffic around the world. The Minnesota Internet Traffic Studies site will integrate with more than 100 sites around the world — some academic and others commercial — that track network traffic, said Andrew Odlyzko, director of the Digital Technology Center at the University of Minnesota and a speaker at last Tuesday's Internet Bandwidth Supply & Demand conference at Boston University, which was organized by Information Gatekeepers. In addition, carriers will share some of their network traffic numbers under nondisclosure agreements, so that traffic loads and patterns can be analyzed and shared, but without revealing individual carrier numbers, he said. Odlyzko is a mathematician who spent 26 years at Bell Telephone Laboratories and its successors. He said he hopes the forthcoming site will help to address such hard-to-predict things as where network demand will come from and how fast traffic is likely to grow.

Qwest adds antivirus service

■ Qwest last week rolled out antivirus and antispam enhancements for its business-VPN and security services customers. The carrier's AVAS gateway service guards companies against receiving unsolicited e-mail, viruses, worms and unwanted content at their external network perimeter. The managed service offers an online portal that lets users control thresholds, reporting, filtering and account preferences. Customers initiate the service by configuring their mail exchange record to point to a Qwest-specified network mail-exchange record. All e-mail is then filtered through AVAS before reaching the user. AVAS is available nationwide. Qwest joins other carriers in the e-mail security market. In August, XO Communications announced the availability of an e-mail security and disaster-recovery service that assists businesses in combating Internet junk e-mail, denial-of-service attacks and viruses.

Verizon Business plans to offer telepresence

■ Verizon Business said last week it will offer Polycom's telepresence video system to its large business customers. The nonexclusive arrangement comes almost two months after Verizon Business said it would test and conduct customer trials of Cisco's competing TelePresence 1000 and 3000 video systems. Cisco unveiled its systems in October. "Verizon Business has meaningful business relationships with both Cisco and Polycom," a Verizon Business spokesman says. "When it comes to providing our customers with the best products and services, we are vendor neutral." Telepresence creates lifelike virtual meetings for participants using large screens and high-definition video to make them feel as though they are all in the same room with one another. In Cisco's case, the systems require 15Mbps of bandwidth. The new

quote of the week
quote of the week
quote of the week

If there is a killer application, it is video. Just watch what has occurred with YouTube, where more than 40 million videos, at over 200TB, are streamed per day. "I would consider that baby-steps in terms of [potential future] loads on networks."

Cisco CEO John Chambers

See story at www.nwdocfinder.com/6558

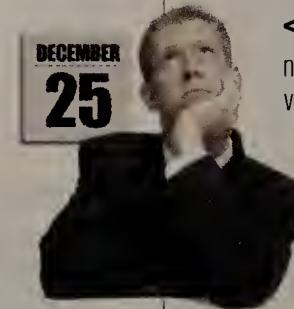
offering, the Polycom RealPresence Experience modular conference suite, is sold in combination with Verizon Business' Private IP VPN and Ethernet services. RPX systems are sold as custom rooms with flat-screen projection displays, ceiling microphones and pop-up LCD screens for sharing data.

Bribery probe delays deal

■ The planned merger of network infrastructure units at Nokia and Siemens AG won't close by the end of this year as expected because the companies will execute a compliance review of Siemens, spurred by the corruption investigation currently shaking the German technology company. Authorities across Europe have been investigating bribery charges at Siemens. Earlier this week, the former head of Siemens' telecommunications equipment group — the one to be merged with Nokia's networks unit — was arrested as part of the investigation. The companies announced plans in June to merge the groups, creating a company called Nokia Siemens Networks that would have had combined revenue of \$20.9 billion. They said at the time that the deal would close by year-end and that the new company would begin operations

The Good The Bad The Ugly

From Windows to robots. Microsoft Corp. last week released the commercial version of its software for robots, hoping to shape the market much as it did for PC software a few decades ago. Its Robotics Studio includes programming tools intended to make it easier to write robot applications, and a run-time environment that allows them to be used and reused on different types of hardware. (IDG News Service)



< **Ready to slack off?** Work productivity notoriously dips during the winter holiday season but a survey released last week suggests that employee productivity takes a nosedive for an entire month surrounding Christmas. Whether it's because of laziness, vacation time or other factors, productivity begins dropping during the two-week period before Christmas, according to a survey of computer use by Arlington, Mass., Glance Networks, a maker of Web demos software.

Beware the 'Rock Phish'. The first thing you need to know about Rock Phish is that nobody knows exactly who, or what, it is. But security experts suspect that Rock Phish is a person, or perhaps a group of people, who are behind as much as one-half of the phishing attacks being carried out these days. "They are sort of the Keyser Söze of phishing," said Zulfiqar Ramzan, senior principal researcher with Symantec's Security Response group, referring to the secretive criminal kingpin in the 1995 film "The Usual Suspects." "They're doing some pretty scary things out there." (IDG News Service)

in January. They now say they expect to close the deal and begin operations in the first quarter of 2007, meaning possibly as late as March.

Worker faces U.S. charges in theft of trade secrets

■ A former Chinese national is facing U.S. federal charges of stealing trade secrets from a Silicon Valley company and selling them to foreign governments. The U.S. Attorney's Office in San Francisco last week filed a 36-count indictment in U.S. District Court for Northern California against Xiaodong Sheldon Meng accusing him of stealing military application trade secrets from Quantum3D, of San Jose, and using them to try to sell the technology to the People's Republic of China, the Malaysian Air Force and the Thailand Air Force. Quantum3D designs high-end graphics computers that run visual simulation training software for military applications such as flight simulators. Meng, a one-time employee of Quantum3D, stole the trade secrets with the intent that they would be used to benefit those foreign governments, according to the U.S. Attorney Kevin Ryan.

COMPENDIUM

Kinder Web hijackers

Seth Finkelstein says spammers are now breaking into vulnerable Web sites and quietly inserting links to their sites in obscure spots — but still good enough to help increase their sites' Google rankings. **Read more at www.nwdocfinder.com/6553.**

■ **NAS question.** A user with a network that has to bridge two types of connectivity asks: "Is there any product that is an external USB hard drive (NAS) which has the dual capability to simultaneously have connections from LAN (RJ45 network cable) and USB?"

www.nwdocfinder.com/6545

■ **What to call 100GB**

Ethernet? Let the naming wars begin! Thomas writes: "Creating a new standard also involves the creation of new abbreviations as well as expectations on feasibility and the availability time line."

www.nwdocfinder.com/6546

■ **Lesson that bears repeating.**

One user says the C-level execs who buy large network infrastructures need to look at recurring costs: "Don't get caught up in initial capital costs, as they will only be one small part of the equation."

www.nwdocfinder.com/6547

■ **When the big swallow the small.**

One user doesn't think much of big vendors buying up small vendors with innovative technologies: "What is the reason behind these behemoths getting credit for purchasing technology that everyone knows will never be integrated properly into their existing products?"

www.nwdocfinder.com/6548

■ **Microsoft robots.**

Can Microsoft make robots that don't need to reboot every day?

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■ **Get a free community account.**

You'll be able to get e-mail notification of discussions and replies you're particularly interested in. And your posts will go up right away, instead of waiting for an editor to approve them.

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■ **NetWare lives.** One user reports his shop is getting ready to ditch Active Directory for NDS running on NetWare servers. And next year, the company is upgrading all its desktops to Windows XP.

www.nwdocfinder.com/6571

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BLOGOSPHERE

Microsoft's butt hinge

Plus: 100Tbps routers and the BlackJack lawsuit

Microsoft's butt hinge. News Editor Paul McNamara asks, "Why does the maker of Windows hold a patent on a door hinge?" With the Google Patent Search tool, he found that Microsoft holds a patent for a "butt hinge with integrally formed butt straps"— and it's a real door hinge, not some new software lingo. Has Microsoft's diversification effort gone too far? www.nwdocfinder.com/6561

Ludicrous speed! Among the 10 superconductivity breakthroughs expected in 2007 is technology to process optical signals in interconnecting circuits, which could lead to 100Tbps routers. Research blog Alpha Doggs reports that the list of breakthroughs, compiled by a developer of superconducting microelectronics technology, includes a 10 teraflops workstation. www.nwdocfinder.com/6562

Kinder, gentler pagejackers. Out: Defacing

Web sites for political statements or graffiti. In: Breaking into well-respected Web sites to quietly add links to some phishing or other site and boost its Google PageRank. Compendium's Adam Gaffin reports. www.nwdocfinder.com/6563

Black*. If you've seen the commercial for Samsung's BlackJack smart phone and thought, "Amazing they got away using 'Black' in the name," you're not alone. Layer 8 wondered that as well, and now Research in Motion is suing Samsung for trademark infringement against its BlackBerry. Coincidentally, the devices look pretty similar, too. www.nwdocfinder.com/6564

Last chance. Keith Shaw notes in the Cool Tools blog that Skype will soon be charging for calls to non-Skype landlines or cell phones. An unlimited calling plan will be available for \$30 a year, or users could pay 2.1 cents a minute. www.nwdocfinder.com/6565

BEST OF NW'S
NEWSLETTERS

Planning ahead for 802.11n

Plus: Spoofing on steroids

Wireless in the enterprise: Approved standards for 802.11n aren't expected for another 18 months but it's not too early to start thinking how it will affect your wireless strategy. Newsletter author Joanie Wexler looks at where you need to prepare. www.nwdocfinder.com/6539

IT careers and training: Experts say the perfect way to answer job interview questions is by telling the interviewer how you solved problems at work and achieved results for your employer — even if some project didn't go as planned. Senior Online News Editor Linda Leung explains. www.nwdocfinder.com/6540

Unified communications: You've heard of spoofed e-mails — false e-mails that are supposedly from genuine sources. How soon will it be before hackers begin leaving messages on your voice mail supposedly from your bank asking for personal information? Analyst Michael Osterman reports. www.nwdocfinder.com/6541

Servers: Cedars-Sinai Medical Center is using Sun's Grid Rack system to process and analyze data that could lead to new treatments for life-threatening and chronic diseases. Senior Editor Deni Connor reports. www.nwdocfinder.com/6542

New data center strategies: As data center networks get faster, could the next step be splitting RAM from the blade servers? Analyst Andreas M. Antonopoulos take a look. www.nwdocfinder.com/6543

IT VIDEO

Hot Seat interviews, the coolest tools and more



Hot Seat:
Good will hacking.
Fiberlink's Dan



Cool Tools:
Travelin' tech.
West Coast
"correspondent" Joel Snyder tells Keith Shaw about his experiences with wireless travel routers, and explains why the SMC version is his favorite.



Twisted Pair:
Podcast:
When Regis blogs, you know it's over. Jason Meserve and Keith Shaw talk about the latest cyber-terrorist threats and whether blogging is officially over the hump.



ASK THE HELPDESK

Find the answers to these prickly problems online.

This week: Newbie gets acquainted with broadband.

Ron Nutter helps a network newbie get her house ready for broadband

Help desk response:
www.nwdocfinder.com/6549

Ratinder Paul Singh Ahuja looks at regulation protecting personal information.

Help desk response:
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M.E. Kabay tackles a cost-benefit analysis of network security

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Mike Karp examines data compression.

Help desk response:
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WHITE PAPERS

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- > The [newest version of Solaris has been released](#) and includes a new feature that allows administrators to use the same command-line interface for both Solaris and the Data General OpenVMS.
- > [Toshiba's 802.11b/802.11a router](#) has been the most conveniently designed and widely used wireless standard, no

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NETWORKWORLD®

'Tis the season for the Postal Service network to deliver

BY CAROLYN DUFFY MARSAN

The U.S. Postal Service expects to ship 20 billion packages and letters this holiday season. Behind that massive workload is an equally massive VPN that is at the forefront of telecom industry trends, including dual sourcing and long-term contracting.

USPS has one of the largest networks in the world, connecting 38,000 locations nationwide and supporting 335,000 users. It spends around \$180 million per year on its network infrastructure.

USPS overhauled its data and voice networks in 2006. The independent federal agency renegotiated and expanded its primary data network contract, while using a secondary contract to upgrade 3,000 sites. The outsourced network is being upgraded to support T-1 and above connections at all of its sites.

"In the last year, we upgraded almost everything, got additional services and saved \$22 million," says Robert Otto, CTO of USPS. "For the next three years, we have achieved \$73 million in cost avoidance because of the contracts [awarded this year]. I'm not only increasing my capabilities, but I'm avoiding additional costs."

For USPS, the network is critical for processing, delivering and managing mail movement. So much of the organization's operations are automated that if a post office were to lose its network connectivity, it would have to switch over to an old-fashioned manual process for handling mail and retail transactions.

"The network is either your strength or your weakness," Otto says. "It's really key in our organization because we want to move to self-service to allow employees and customers to do almost everything for themselves. If you don't have a robust network, you have a problem."

Outsourcing and dual sourcing

USPS was an early advocate of network outsourcing, awarding a contract to MCI to handle its WAN infrastructure in 1997. The contract, dubbed MNS, for Managed Network Services, worked well until MCI parent company WorldCom hit the financial skids in 2002.

That's when Otto decided it was too risky for USPS to stick with MCI — now Verizon Business — as its only network service provider.

"I wanted to move to a two-provider network where in essence I had two big players owning portions of my network, and then I could leverage them against each other," Otto says.

USPS initially tried to hire a systems integrator to

Five penny-pinching tips

Robert Otto, CTO of the U.S. Postal Service, has the reputation of being a penny pincher when it comes to negotiating contracts with vendors. Otto offers the following tips for driving down costs on network contracts:

- Wait until right before a vendor's fiscal quarter or year-end to sign deals to get your best deal. "Every week you make them sweat by not signing up, the deal gets better," Otto says.
- Demand discounts. Otto won't sign a contract without a 30% to 40% discount. Some of his discounts are as high as 95%.
- Be willing to walk away. "I've had to walk away from two contracts over the last seven years," he says. "You better be prepared, because it will cost you more to set up an alternative solution. But in both cases, after six months, the companies came back and wanted to renegotiate."
- Sign a long-term deal to get bigger discounts. "If you are willing to sign a five- or seven-year deal instead of a three-year deal, you'll be surprised at the discounts," Otto says. He includes a clause so he can terminate contracts at his convenience.
- Benchmark your prices. USPS demands the best pricing in the industry and benchmarks those prices with Gartner. Otto is looking forward to the award of the 10-year, \$20 billion federal Networx telecom program expected in March 2007 so he can benchmark his rates against Networx rates.

manage its data, voice, video and wireless networks, but that approach failed. In October 2004, USPS awarded Lockheed Martin an 18-year, \$3 billion contract that was supposed to replace the old MCI arrangement. It canceled the Lockheed Martin deal in July 2006.

"There was an attempt by the systems integrators to move into the core network services, but they were not quite as agile as we can be in terms of reacting to change and technology insertion," says Jerry Edgerton, group president for Verizon Federal. "Now USPS has gotten an arrangement where they are dual sourced We happen to think that's the wave of the future."

In October, USPS renewed its original MNS contract with Verizon Business for four more years. USPS also expanded the contract to let Verizon Business manage its LAN switches and wireless access points.

"Verizon Business went back and renegotiated their pricing," Otto says. "We probably got a 10% to 12% reduction with our costs."

Winning the MNS contract extension validates that Verizon Business had put its WorldCom woes behind it, Edgerton says.

Meanwhile, AT&T has migrated 3,000 USPS sites to its network under a separate deal. AT&T also provides USPS with interactive voice response systems and a Web portal for IT help desk services.

"AT&T runs the full gamut with Postal, providing everything from VoIP services to supporting all of their call centers," says James Hollar, AT&T's client business manager for the U.S. Postal Service. "We're in the pro-

See USPS, page 14

In Their WORDS

Vendor Solutions for Your IT Challenges

COMPANY: Netcordia

OVERVIEW: Founded in 2000, Netcordia develops NetMRI, an automated Best Practices based network management appliance. NetMRI is the most comprehensive, fully integrated network diagnostic tool for enterprise and government networks. This plug and play unit allows a network engineer to easily and quickly identify issues with respect to VoIP, configuration compliance, VLAN, and IP within the network.

CHALLENGE: As technology is becoming an integral part of everyday business, enterprises are placing more rigorous demands on their networks, expecting high reliability, rapid response time, consistency and compliance. These demands have network engineers searching for a way to proactively and cost-effectively manage the network infrastructure without utilizing too much staff time and energy.

SOLUTION: Netcordia provides the solution with NetMRI, an award-winning network analysis appliance that goes beyond reporting to provide analysis based upon expert rules and best practices. With NetMRI, network managers can optimize their networks, pinpointing and solving present and potential hot spots. What may have previously taken numerous IT professionals hundreds of hours to uncover, a single NetMRI unit now easily finds in minutes.

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Events

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for the larger get-togethers to aggregate people, but [then] it tends to segment."

Enter the boutique event. These smaller shows with a tight focus on one aspect of technology — think VON, CTIA Wireless, RSA Conference — promise greater value and fewer sore feet than sprawling trade shows that try to be everything to everyone.

It's the popularity of the Internet — where information on just about anything can be sliced and diced within seconds — that has brought about the focused trade show of today, says Rick Geritz, CEO of BD Metrics, makers of attendee-relationship management technology.

However, the larger shows still offer value, especially for attendees looking to investigate three or four technologies at an event.

Today there are ways to avoid wandering aimlessly through conference halls; many shows including Interop offer conferences within a conference that stack up sessions dedicated to a topic such as network security or mobility. And companies such as BD Metrics have developed technology that attempts to make a boutique show out of a sprawling expo by highlighting only what the attendee wants to learn about — based on title, keywords, vendors they want to contact and so on — in the context of a full-content event, Geritz says.

We've scanned the IT trade show calendar for 2007 to come up with a list of events that will likely offer the most bang for your buck. Incorporating the experiences of the *Network World* staff, which collectively have attended dozens of events in 2006, following is a list of what will be worth your time:

Consumer Electronics Show (CES), Las Vegas, Jan. 8-11

CES is the new Comdex, with attendee estimates as high as 140,000 for the 2007 event. But despite its size, many show veterans say if you want to take the pulse of the industry, CES is where to do it. With 1.7 million square feet of expo space the event is giant — no doubt you'll leave feeling you've missed something — but offers a great view of the intersection of the PC and entertainment industries; keynote speakers for next year's event include Bill Gates and Michael Dell as well as the pres-

Network World's homegrown shows

From DEMO's gadgets to The Security Standard's focus on network protection

Not to toot our own horn too loudly, but *Network World* has its own portfolio of events that cover a wide range of technologies and professional interests. A complete list of our events is at www.nwdocfinder.com/6525; below are some of the highlights for next year:

DEMO '07, Palm Desert, Calif., Jan. 30 — Feb. 1 (www.nwdocfinder.com/6538)

DEMO is unique. Targeted primarily at investors, big vendors with acquisition on their minds and high-level technology execs who want to see what's coming down the pike, this event is for start-ups to take the stage for six minutes and give their pitch. While many of the companies have a consumer focus, DEMO offers a venue for spotting new technol-

ogy trends in the enterprise or getting a preview of consumer developments that might make their way into the corporate arena.

IT Roadmap Conference & Expo, Boston — March; Chicago — April; Santa Clara — June; Dallas — September; Washington, D.C. — November (www.nwdocfinder.com/6527)

These one-day events tour the country throughout the year, focusing on a handful of technologies in multiple tracks. Mixing content from analysts, IT customers and vendors, next year's focus will be on security, VoIP, data centers, mobility, network access control, network and application acceleration, network management and storage.

idents of Walt Disney and CBS.

As for the show's focus, you may need to pass by dozens of consumer gizmos before coming across something you would actually allocate budget for. At first blush enterprise IT types might brush off all that gadgetry as irrelevant, but as one *Network World* staffer puts it: "Your boss called, he's shutting down the branch offices and wants the sales reps to work from home. OK if they pick out their own [small office/home office] IT gear, expense it and have you support it?" Visiting CES might give you the familiarity with new technology you'd need to get through that situation.

Plus there's the celebrity sightings: Justin Timberlake, Dana Carvey, Tom Hanks and Morgan Freeman all appeared in 2006.

RSA Conference, San Francisco, Feb. 6-9

Going on its 16th year, the RSA Conference bills itself as the world's largest community of information security professionals. Conference tracks delve deep into security technology, with 2007's event covering aspects such as authentication and developing with security. However, despite the technical depth of the content, it's easy to get lost in the noise of this conference with the "increasingly Mardi Gras-like parade of vendors, speeches, presentations and other events that may overwhelm the attendee," says one *Network World* reporter.

Any vendor serious about security will be on hand. Oracle CEO Larry Ellison will take the stage for the first time at this event, as well as perennial keynote speakers Gates and, of course, the head of RSA Security, now owned by EMC. The theme for the 2007 conference is "celebrating

the influence of 15th-century Renaissance man Leon Battista Alberti, who created the polyalphabetic cipher," according to the Web site. Perhaps more interesting will be the vendor-sponsored Texas hold 'em contest.

IBM's SHARE User Events, Tampa, Fla., Feb. 11-16 and San Diego Aug. 12-17

User events can be tricky; they need to be technical enough to get serious questions answered, but broad enough to still be interesting. Attendees say the quality of the technical sessions at SHARE User Events is high and the access to IBM engineers and executives is impressive. Perhaps that's because the event is organized by SHARE, which is an independent, volunteer-run IBM user association.

The event, which began as a gathering of mainframe users and has been going on for more than 50 years (www.nwdocfinder.com/6570), bills itself as a place where IBM users can influence future product direction and get a glimpse of new technology from Big Blue and its partners. There are some wacky antics — as you may expect would happen at any show that's been running for 51 years straight — such as sing-alongs and Button Man sightings.

LinuxWorld OpenSolutions Summit, New York, Feb. 14-15

This new event, aimed at corporate IT professionals, is designed to reflect Linux's move into the mainstream. The agenda is heavy on technical sessions and case studies, and stresses attendees learning from each other.

LinuxWorld OpenSolutions Summit grew out of the LinuxWorld conference

The Security Standard, Chicago, September (date to be announced) (www.nwdocfinder.com/6526)

Organized by *Network World* and other IDG publications, this event debuted this past September as a two-day confab designed to cover the business, political, technical and cultural challenges surrounding information security. Highlights of this year's event included Cisco's John Chambers keynote address, a panel of Microsoft executives gathered to answer security-related questions and a number of speakers from enterprises including Wal-Mart, Thomas Weisel Partners, Liberty Mutual Insurance Group and Fidelity Investments.

— Cara Garretson

to better focus on corporate deployment of open systems in verticals — the February show will cater to financial services, healthcare, pharmaceutical, retail, media and the public sector. Topics to be covered include security, network management and interoperability, applications and best practices, virtualization, desktop and legal issues.

(This event is organized by IDG World Expo, a sister company to *Network World*.)

VoiceCon, Orlando, March 5-8

Billing itself as the place to "build your IP telephony platform," VoiceCon has been around for 16 years and has a concentrated audience with roughly 5,000 attending the 2006 spring event. The content also is focused, as evidenced by the speaker line-up that includes top brass from Avaya, Cisco and Nortel. Sessions will touch on technical issues such as IP-PBX system security as well as business concerns such as the organizational impact of migrating to converged networks.

Our reporters say this event has more enterprise appeal than VON and better content and speakers than Internet Telephony. The spring version of this show will be the one to attend in 2007.

CTIA Wireless, Orlando, March 27-29

Run by CTIA — the Wireless Association (which used to stand for the Cellular Telecommunications Industry Association, but the group is looking to widen its focus), this event covers the spectrum of wireless developments, but its bread and butter continues to be cell phones. Still, there are some enterprise issues on the event's 2007 schedule, such as day-long programs dedicated to

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www.nwdocfinder.com/6557

Nortel

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communications, including the evolutions on IP. We are very committed to lead again and we believe we are bringing our innovation back to a core competency [with] smarter commercialization of that technology. And most important, a company that's going to make business simple and more flexible than any other company out there.

Your plans to reduce R&D spending to 15% from 17% of revenue means your total annual R&D spend will equal that of Cisco just in the service provider market. How do you compete when you're being out-spent by that much?

We are very committed to being really relevant in all of the places where we participate. We are a strong No. 2 in [Code Division Multiple Access], for example. No. 2 in [enterprise] VoIP; No. 2 in Ethernet switching; No. 1 in carrier VoIP [and] in Metro Ethernet; No. 1 in packet switching and No. 2 in optical. One of the reasons we decided to exit [Universal Mobile Telecommunications System] (www.nwdocfinder.com/6572) is just for that reason: four or five point market share, maybe seven. We were so insignificant. The challenge for us is spending well. We are not underspending relative to revenues.

Some analysts view Nortel's absence in the current rounds of consolidation to be a detriment. Is consolidation necessary for Nortel's long-term survival?

We are in favor of consolidation. Fewer [carrier] customers presents some pricing advantages. Do we plan to grow inorganically? Yes, we bought Tasman Networks [for enterprise routing]. We bought [govern-



“We need to walk before we can run and we have quite a big opportunity in the enterprise. . .”

Mike Zafirovski, CEO, Nortel

ment integrator] PEC. We have the joint venture with LG [Electronics].

The Lucent and Alcatel combination is complementary [to both companies]. Lucent is big in CDMA, Alcatel is not, for example. Would bulking up or complementing some of our portfolio at some time in the future be beneficial? The short answer is: of course. We'll keep our eyes on it very much.

Do you have any specific goals or priorities for each line of business — Mobile, Metro Ethernet, Enterprise and Global Services — going into 2007?

We just spent two pretty long days on budgets. It's pretty exciting to think what we will be able to do with the enterprise side. And to take full advantage of the collaboration with Microsoft [on unified communications]. Also, we will be working very closely with companies like IBM to start introducing the concept of 'Nortel Inside.' [Nortel declined to elaborate on this campaign, which it plans to detail next year. Nortel and IBM already collaborate on development of IP Multimedia Systems applications using servers from both companies, plus IBM software.] Also we are quite bullish on what's going to happen with WiMAX.

Nortel's been quoted as sizing the WiMAX market at \$7.5 billion by 2010. Is the company sticking with that forecast and are you seeing a return on your increased investment in WiMAX?

We are already taking revenue. We are very excited about our announcement on a transaction with Chunghwa Telecom from Taiwan. Not a trial, but an actual order, which we'll be delivering in the first part of next year. As Sprint, Chunghwa Telecom or the established players demonstrate the power of WiMAX, I believe the upside is greater than the downside, with respect to the size of that market.

munications solution. They'll see part of that in the latter part of 2007 and of course, that's going to become more prevalent in 2008 and beyond. Most significantly, this is opening doors for both of us.

Any plans to expand into the consumer market?

Not yet. We need to walk before we can run and we have quite a big opportunity in the enterprise — large, medium, and [small and midsize businesses].

How would you sum up Nortel's progress since you joined?

We're absolutely thrilled with the reception from customers and employees as well as with our prioritization on bolstering

the processes, putting in Six Sigma [principles] to address our quality standards and reinstating [time-to-market] — a sophisticated product introduction process that the old Nortel used to have to really pump products. I give ourselves an A-plus on that.

I wish we had made more progress on our gross margins [Nortel was shooting for 40% plus but came in at 38% in the third quarter, down from 39% the year before]. We've been able to become more competitive but industry pricing has also been quite challenging, particularly on the carrier side. The good news is we have stabilized our gross margin . . . declines. ■

A time of reckoning on my predictions



NET INSIDER
Scott Bradner

Last January I made some predictions in this column. Now that the year is ending, it's time to see how I did on a scale of -5 to +5.

• I predicted the courts would throw out the FCC's Communications Assistance for Law Enforcement Act extensions. That has not happened — yet. The first court upheld the extension and an appeal of that decision was denied earlier this month. The game is not over but it's not looking good. -3

• I made the call that the underlying purpose of the replacement for the current telecom law would be to protect incumbent telephone companies. That clearly was the intent for the bill that was pending when Congress recessed without acting on it. +5

• I predicted proponents for a new telecom bill would claim that it would ensure an open Internet and competition for users, enable new applications and continue the growth of the Internet. I read all of those assertions by the traditional telecom folks during the debates. +5

• I talked about my SCO Group predictions last week (www.nwdocfinder.com/6524). I was all

wrong (although I was close when I said SCO would not be able to show any examples of protected code). -5

• I said the U.S. Patent Office would increase the number of patents with obvious prior art. It's hard to tell on this. There has certainly been some news coverage of patents that looked at first blush to be obvious, but it will take some time to understand how bad (or good) things are with the Patent Office. 0

• I predicted Congress's data protection and privacy laws would not do much more than override strong state laws. I was wrong on this, but only because Congress did almost nothing in this area other than a quite reasonable antipretexting law that was sent to the president. Other than that one aberration, which was driven by the publicity around the HP case, Congress did not do the useful things that I thought it would not do. +4

• I predicted AT&T's half-billion-dollar ad campaign would do little more than enrich an ad company. I've thought about it, and I do not recall any AT&T ads. So it looks to me like any money spent was not well spent. +5

• I predicted Intel spending \$2 billion and never mentioning Intel Inside also would mostly

enrich an ad company. I do remember seeing some Intel Inside ads, but they did not stick with me. Advanced Micro Devices made more progress in a number of areas — and I still do not know what Viiv stands for. +4

• I anticipated that Sony's root-kit settlement would just help Eliot Spitzer become governor of New York. Well, he made it, and there was no other visible outcome. +5

• I predicted that the number of serious security issues in Windows would be too many to count. That was not quite the case. The CERT reported 5,340 vulnerabilities in the first three quarters of 2006 — many of them Windows-related. (www.nwdocfinder.com/6523) +2

• Finally, I predicted that Apple's Intel-based approach would double its market share and be broken quickly, permitting the software to run on any Intel platform. Both predictions were right. +5

That's 27 out of a possible 55.

Disclaimer: Harvard keeps score of presidents and Nobel prize winners, not predictions, so the above must be mine.

Bradner is Harvard University's technology security officer. He can be reached at sob@sobco.com.

nww.com

WiMAX buyer's guide

This guide includes product descriptions for WiMAX-enabled equipment, including base stations, subscriber units and access points. Products can include equipment aimed at carriers in addition to enterprises.

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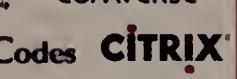
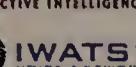
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Events

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cated to VoIP mobility and wireless data. the spring show — the event features a mobile fashion show of wearable electronics, and among the industry luminaries who have spoken in the past are entertainment kingpins Sean "P.Diddy" Combs and Russell Simmons.

Gartner Symposium/IT Expo, San Francisco, April 22-26

This conference covers a wide range of technologies, business issues and management strategies, but with the benefit of the Gartner analysts' filters; all attendees have the opportunity to meet face-to-face with as many as three Gartner analysts during the event. The speaker lineup for 2007 isn't out yet, but this year's event attracted Microsoft CEO Steve Ballmer and Cisco CEO John Chambers, both of whom took the stage to be grilled by Gartner analysts. And the analysts do the bulk of the presenting at the event, corralling most of the vendors to the expo floor.

The event is small and expensive; 2006's show had 6,000 attendees, and early bird registration for the 2007 conference is \$3,495. However, in addition to access to Gartner analysts, the event offers attendees access to each other. "The way the show is laid out ... everybody eats breakfast and lunch together in a huge tent. This provides a great way for people to network," a *Network World* editor says.

The event is open to all IT professionals, not just Gartner clients.

Web 2.0 Expo, San Francisco, April 15-18

This new show grew out of the Web 2.0 Conference, which has become an invitation-only event focused on next-generation Internet technologies. It is supposed to focus on the practical application of Web 2.0 principles, and will feature an expo floor as well as technical sessions and tutorials.

Skipping the big ideas behind Web 2.0 in favor of finding out how to make these technologies work sounds like a wise way to spend your travel budget.

Storage Decisions, Chicago, May 5-7

This highly focused event — the one in September attracted 500 storage managers —

aims to interest both storage specialists as well as IT executives by covering technical and business issues related to storage. With such a small number of attendees, the event bills itself as a great place to network with "true peers."

Little information is available about the May 2007 event, as the Web site focuses on the pending December show, which has as a theme scaling storage while managing costs. The speaker list for these shows is heavy on analysts and consultants, with some vendors and users mixed in.

Interop, Las Vegas, May 20-25

Billing itself as the meeting place for the IP infrastructure market for the past 20 years, the spring version of Interop really can't be missed, unlike its fall counterpart, which in 2007 will be in New York and has become something of a snoozer. Not only do the show organizers arrange programs by technology — next spring's show promises to cover application networks, data center, infrastructure, network security, VoIP and collaboration, and wireless and mobility — but there are also boot camps tailored to specific titles.

As expected the show took a hit in attendance following the dot-com bust and its effect on the network industry, as well as the tightening of IT budgets that ensued. But Interop Spring 2006 saw a bit of a renaissance in interest and buzz, attracting around 18,000 attendees, according to conference organizers. Next year's event promises more of the same.

NXTComm, Chicago, June 18-21

This new show is the melding of two existing events, GlobalComm (which grew out of Supercomm) and TelecomNext. Put on by the Telecom Industry Association and the United States Telecom Association, this is another event billed as the place where the IT and entertainment industries converge — albeit with more of a telecom slant.

Not much is known about the event — the organizers haven't even officially decided on a show logo yet — but predictions put the number of attendees at 22,000. Because it will fill

the void left by the closing of two other shows, it's likely to become the defacto must-attend telecom show. Hopes are that the event will regain much of the value and buzz that Supercomm enjoyed in its heyday.

Alternates

If you've got schedule conflicts or quarterly travel budget restraints that would keep you from attending one of these shows, consider the following alternatives:

InfoSec World, Orlando, March 19-21

If you can't make it to the RSA Conference, InfoSec is a good alternative. A bit quieter than the RSA Conference, InfoSec also focuses on all things security and in 2007 will offer sessions on a range of topics including risk management, identity theft and endpoint security, to mention a few. There also will be a few one-day summits that drill down on specific topics, such as compliance, and a special track for CISOs. Plus, who would want to miss William Shatner's keynote address entitled "A trek from science fiction to science fact"?

Voice on the Network, Boston, Oct. 29-Nov. 1

Celebrating its 10th anniversary this year with roughly 10,000 attendees at the fall event, VON's focus encompasses IP communication in the enterprise and the development of Internet-based entertainment. Speakers at this year's fall event ran the gamut from Ted Leonsis, vice chairman of AOL, who talked about the company's expanding video services, to enterprise types such as a network engineer at Liberty Mutual who stressed the importance of VoIP security. Next year's fall event will cover VoIP-related topics as diverse as fixed mobile convergence and IPTV.

Storage Networking World, San Diego, April 16-19

Organized jointly by *Network World* sister publication *Computerworld* and the Storage Networking Industry Association, this relatively young event enters its ninth year in 2007. The event promises to highlight storage trends while featuring user case studies and offering hands-on tutorials from SNIA. ■

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USPS

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cess of upgrading the 3,000 sites that we brought on to high-speed data services of the future."

Today, Verizon Business has 75% to 80% of USPS network traffic, while AT&T has the rest.

USPS is a major customer for both carriers. Verizon Business earned \$129 million on its USPS business in 2005 and is expected to earn a similar amount in 2006, according to Federal Sources, a McLean, Va., market-research firm. Meanwhile, AT&T has grown its USPS business from \$4.8 million in 2005 to an estimated \$35 million in 2006.

Dual sourcing is a good strategy, but it requires additional management overhead

to oversee two contractors instead of one, says Ray Bjorklund, senior vice president at Federal Sources.

"Having a single contractor is a whole lot easier," Bjorklund says, "but the service performance often does go up with dual sourcing."

USPS is getting better prices, better services and upgrades because of the competition between Verizon Business and AT&T.

"If you go to install a site, AT&T or Verizon will ask for \$1,000 for an install," Otto says. "You can get them to negotiate that price by pitting them against each other. One waived the fee and the other reduced it to such a low number that it's not important. If you're installing 6,000 sites and being charged \$1,000 a site, you're spending \$6 million for the privilege of installing." ■

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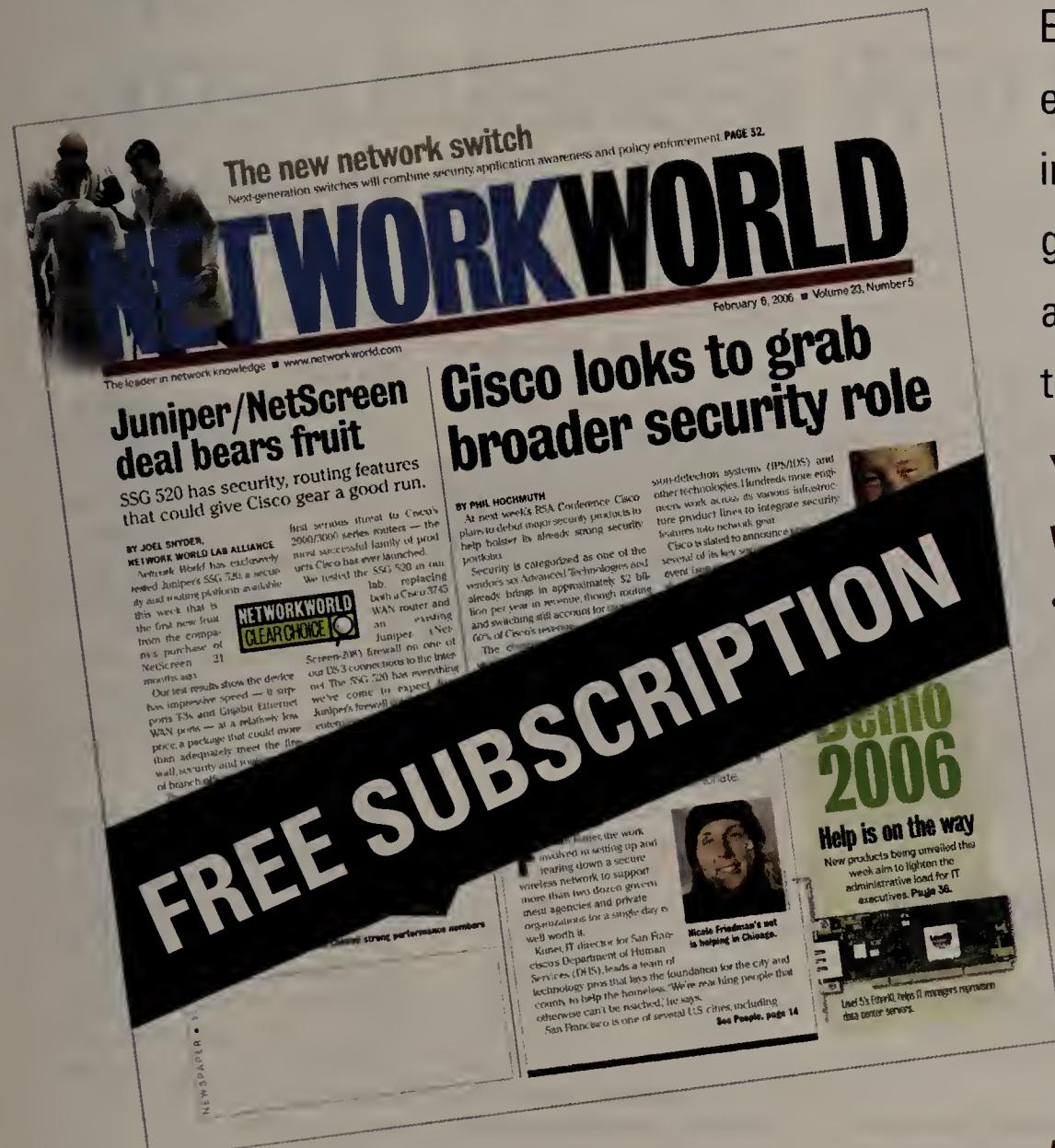
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Colors

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Bridge Venture Partners alone counts BlueNote Networks, BlueShift and Bluespec among its investments. The Bluetooth wireless technology has created a spectrum of colorful companies from BlueAnt to Bluetrek.

Not that the industry's color palette is limited to blue and its association with loyalty and trustworthiness. There's also France Telecom's Orange mobile business, Google's yellow enterprise search boxes, a rainbow of wiring color standards and Apple products, and everything from the Black Hat briefings for security experts to such new companies as Code Green Networks.

Red is popular, too. Novell has been called Small Red and Big Red for its Pantone 485-shaded logo and the boxes in which it shipped NetWare (not for its financial results in recent years). Ray Noorda, the company's late CEO, used to tell a story about walking into a computer store and asking the clerk what color box stood out the best on the shelf. The clerk said red, so Noorda went with that. The official story out of Novell today is that the company did a Christmastime launch in the mid-1980s and decided on red, which stuck.

Novell competitor Red Hat has made a name for itself in Linux, due in part to co-founder Bob Young hammering it up for the cameras wearing a red fedora. Young has said one reason the company is called Red Hat is that red symbolizes revolution and liberation. More specifically, the name came from co-founder Marc Ewing's penchant for wearing a red lacrosse cap when he was at Carnegie Mellon University, as well as his habit of naming his software projects Red Hat 1, Red Hat 2 and so on. While the company originally used a clip-art top hat as its symbol, today it boasts a red fedora that has a great deal of meaning for the company, says Chris Grams, director of brand communications and design. "The fedora has become a symbolic gift that Red Hat gives to employees and others who have done great honor to or service for the company," he says. "We all wear our fedoras with pride."

Because of Red Hat's strong brand recognition, it hasn't had problems with customers confusing it with other red companies, such as telecom equipment maker Redback. From time to time, however, it does get mixed up with the Red Hat Society, an organization for women 50 and older, who wear red hats when

Network rainbow

A sampling of the industry's colorful side.



- Red Hat co-founder Bob Young sports the company colors on the cover of his book.



- IBM didn't embrace its Big Blue moniker right away, but eventually even used it on its annual report cover.



- Don't be confused: Even Extreme Networks' BlackDiamond switches are purple.

they get together. "We do occasionally get the opportunity to talk to nice older women about why they should consider using Linux and open source technology," Grams says.

Purple power

Extreme Networks is a company of a different color: purple.

Chairman Gordon Stitt, who co-founded Extreme in 1996, proudly pleads guilty to choosing for his company the color of Teletubby Tinky-Winky and singer Donny Osmond. The choice (made in conjunction with an outside designer) grew out of Extreme's logo color,

which stemmed from the then-start-up's desire to create a distinctive personality.

"The color was a pretty big part of our story," Stitt says. "People at trade shows would look at our products and ask why they were purple. It gave us an opportunity to tell our story about a new class of products called Layer 3 switches that give you 10 times the performance of a router at a 10th the price and give you quality of service."

Stitt says the company's loyal followers refer to themselves as "painting their data centers purple" or "bleeding purple." New-employee orientations stress "purple power," the internal name for a product launch is Purple Reign and Extreme's partners work with it through the Go Purple program. Microsoft, a big customer, once sent the company a Barney dinosaur doll after receiving an order of Extreme switches, Stitt says. "It's embedded in the culture," he says.

Steve Mullaney, vice president of marketing at Blue Coat Systems, says using colors to market a company and its products is a time-honored tradition that transcends the network and IT industries. The goal is to get an emotional response, he says. "Whether red to underscore urgency or exclamation, purple to stand out from the crowd, or blue to elicit security and comfort, no one can view colors without feeling some unconscious emotional effect," he says. "It's even becoming more apparent in sector references like 'green technologies.'"

While some might find all these colorful company and product names a bit much, things could be worse, Blue Coat's Mullaney says. "It's at least more dignified than all those networking companies who felt the need to use their company name to answer the question, 'If you were a tree, what kind of tree would you be?'" he says. ■

appearance in the press in a 1981 *Business Week* story, according to LexisNexis and other search engines, that cited "the pervasiveness of IBM's blue computers." We asked longtime IBM watchers where the nickname came from and got a boatload of plausible explanations, including: IBM's status as a Blue Chip company, the blue suits traditionally worn by the company's executives, the blue covering on its mainframes and other products during the 1960s, and even the big, blue letters in its logo.

To sort things out, we put the question to Paul Lasewicz, IBM's corporate archivist, but even he said the answer wasn't black and white: "There's no definitive answer to that, except to say that the term first emerged outside of IBM, apparently in the early 1980s, although we can't confirm that."

What is known is that IBM initially shunned the term and even got into a legal scrape with a computer distributor called Big Blue Products in the late 1980s over the term's use. Eventually, IBM embraced the moniker, even using it on its 1995 annual report's cover, "The New Big Blue." IBM has gone on to work the color into the names of some of its supercomputers, such as Deep Blue and Blue Gene.

While some might find all these colorful company and product names a bit much, things could be worse, Blue Coat's Mullaney says. "It's at least more dignified than all those networking companies who felt the need to use their company name to answer the question, 'If you were a tree, what kind of tree would you be?'" he says. ■

IBM releases free search software

BY JOHN FONTANA

IBM and Yahoo last week released free search software aimed at small and midsize businesses that want to search across their internal documents and content. IBM is using price to battle competitors who also are aiming entry-level search software at corporate and departmental users.

IBM OmniFind Yahoo Edition lets companies crawl file servers and index intranet pages. It also includes an option for searching across the Web via Yahoo search.

The entry level software, which runs on Windows or Linux servers, lets users index as many as 500,000 documents per server, supports more than 200 file types and can read files in more than 30 languages. Unlimited telephone support is available from IBM for \$2,000 per year.

With the new release, IBM is not only making a play to boost the visibility of its OmniFind line of search software, but also taking a shot at Google, which offers an entry-level search product called the Mini that is priced at \$2,000. IBM also hopes to put pressure on Microsoft, which just introduced the SharePoint Server 2007 for Search, which is only available to Microsoft's volume licensing customers.

"I would not be surprised if Microsoft comes out with a free product or if Google tries to differentiate its Minis in some way," says Matt Brown, an analyst with Forrester Research.

Users are jumping on OmniFind Yahoo, including Decision Critical in Austin, Texas, which offers hosted services that help hospitals plan and assign training courses to nurses and other personnel.

"We are not in the content business, so the challenge that we have is that the content provided by our partners is in many different forms," says Eric Brierley, CTO of Decision Critical. The company provides access to more than 450 continuing education courses for about 300,000 users at 400 hospitals.

Brierley says he can filter search results for individual users because not all hospitals subscribe to all the content Decision Critical provides.

OmniFind Yahoo Edition includes features such as automatic spell correction, support for synonyms and shortcuts, wildcard support to substitute for unknown characters, query reporting and graphical user interface customization. High-level security features, however, are not available until a user steps up to the OmniFind Enterprise Edition, which is priced starting at \$30,000. ■

Do you know your network colors?

- Take our quiz on the colors of networking. www.nwdocfinder.com/6566

- More on why Red Hat is called that. www.nwdocfinder.com/6567



- A brief Q&A with Extreme Chairman Gordon Stitt. www.nwdocfinder.com/6568

- The story behind France Telecom's Orange business. www.nwdocfinder.com/6569

By 2010, the increase in expense to power and cool servers is projected to be approximately four times the increase in new server spending.¹ The IBM System x3655 Express can help control rising energy costs starting today. How? It comes with an ingenious technology called PowerExecutive™ which allows you to allocate power to each server, helping to optimize and save you money.² Only IBM has it. The x3655 is just one of many Express systems designed for business performance computing. With IBM, innovation comes standard. So why waste energy on anything else?



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SPECIAL FOCUS

ENTERPRISE SECURITY

IP-based digital video surveillance grows up

Cisco, IBM, Mobotix and others growing IP-based digital security systems

BY ELLEN MESSMER

Video surveillance traditionally has been a closed-circuit, analog affair run by a company's physical-security staff. But with the rise of IP-based digital systems, video surveillance has become just another application on the corporate network managed by the IT department.

Motion-activated, IP-based digital surveillance cameras, including those from Mobotix and Axis, capture better detail than analog cameras do. Their video footage typically is stored in corporate servers and shared over IP networks. But digital cameras tend to be almost double the price of analog cameras, so organizations think twice about throwing out their old cameras. A common transition step involves converting analog to digital streams to transmit video surveillance traffic over corporate LAN and WAN links.

That's the approach the state of Utah is taking in two of its agencies, the Utah

6Mbps per camera. With IP-based digital video, you can use on-demand and multicasting, which definitely is less bandwidth. Maintaining it is easier because we have people in IT experienced in network management," he says.

UDABC, which controls Utah liquor sales, decided on a similar analog-to-digital transition step for its 38 state-run retail liquor stores that are monitored for theft by Toshiba cameras.

"We can convert the analog, Surveillix-brand cameras from Toshiba with their video-capture board now," says Kevin Perry, UDABC's tech support specialist supervisor. The state agency would prefer fully IP-based digital cameras because "digital's quality is better and analog cameras are not motion-sensitive," he says. But due to cost considerations, the decision was made more than a year ago to make a gradual transition.

If a store manager suspects a theft has occurred, a review of video surveillance footage stored locally in servers may result in a video extraction that can be viewed remotely by authorized state employees or law enforcement.

The decision to share video footage over the state's WAN prompted bandwidth questions.

"We first looked at streaming 100% of the data from the cameras across the network" to the UDABC's main data center in St. Lake City, Perry says. But with 15 frames-per-second video taking up about 2Mbps of bandwidth, that idea was viewed as too bandwidth intensive. The state of Utah decided to set up storage-area networks locally in the liquor stores to warehouse a month or two of captured video.

As with other Windows XP-based computer systems, the Surveillix pan, tilt and zoom system has to undergo maintenance. "We do patch management and run antivirus on it," Perry says.

Managers of video surveillance systems need to be sure they understand the applicable federal and state privacy laws, Perry says. Because there are laws specifically prohibiting recording conversations, surveillance systems typically are visual but not audio recorders.

Network-equipment giant Cisco is bullish on IP-based video surveillance, getting into the business earlier this year through its acquisition of SyPrix Networks, a maker of physical-monitoring systems that support purely digital, IP-based video cameras and analog-to-digital and digital-to-analog traffic.

"Ninety-eight percent of the installed video cameras are analog today," says Mark Farino, general manager of converged security in Cisco's Emerging Market Technologies Group. Farino says Cisco's strategy is to support the transition from analog to digital, while introducing innovations of its own in the coming year.

Corporations use SyPrix gear to stream video traffic captured by different manufacturers' cameras over IP networks into the Linux-based SyPrix storage system, while the Stream Manager application enables viewing live video and playing back recorded video based on interconnected IP-based and analog cameras.

Another firm, VidSys, also provides a way to integrate digital and analog video surveillance cameras through its software, VidShield. "A digital camera costs almost double the price of an analog one, although prices are dropping," says Tony Lapolito, VidShield's vice president of marketing. "So we're open to using anyone's decoders, encoders, cameras, storage and digital video recorders." A VidSys integration project typically costs about \$70,000.

A question of Cisco

Next year, Cisco — which is dropping the SyPrix equipment name — expects to introduce upgrades for IP-based video surveillance. Farino says Cisco is working on ways to integrate its video surveillance system with physical badge systems, so a camera could be activated to zoom in on someone wearing a specific badge and be able to follow that individual.

Cisco also is working with IBM on its Smart Surveillance System announced in November, software that IBM says will provide advanced monitoring and stored search capabilities.

"IP-based surveillance is the future," says Gartner analyst Jeff Vining. "It used to be expensive, but it's now mid-range."

Some of the most impressive technologies are to be found in the IP-based cameras, including Mobotix, and the search-and-retrieval systems from vendors including 3VR Security, ObjectVideo and VistaScape Security Systems, Vining says.

IP-based digital video surveillance offers enormous flexibility in monitoring and archive searching, but organizations should ensure video traffic is encrypted for security purposes, Vining says.

In the most advanced systems, the software found in the camera picks up motions and can identify the difference between a "simple hug" of a person and "if I'm trying to strangle you," Vining says. To use IP-based digital video successfully, it pays to have a good infrastructure, he notes — or to use a dedicated network.

Cisco Director of Engineering Mark Geiger says bandwidth allowance depends on the camera's frames per second and the compression and pixel range. For example, a camera in MPEG-4 Compression Image Format running at 30 frames per second would require about 3Mbps of bandwidth.

At Mobotix, the German-based maker of IP-based digital cameras, CEO Ralf Hinkel says the Mobotix cameras are designed specifically to lighten the network load.

Mobotix lightens up

The high-resolution IP-based Mobotix cameras contain Linux-based computers with software designed to store the recorded video footage triggered by motion detection, rather than stream it continuously to a server for processing.

The end result, according to Hinkel, "is that the camera does the recording because it's a PC, with 64 megabytes for six minutes. It's motion sensitive, so if nothing happened, there's no network load from the camera." When transmitting video, the digital camera establishes a Secure HTTP tunnel to a designated computer storage system through a buffering process.

The 1.3 million pixel Mobotix camera, supporting 30 frames per second, also is a "standard IP telephone" based on the Session Initiation Protocol, Hinkel says. The camera can be set up to call an individual's PC and deliver a recorded voice message about a visual event. It costs about \$700. ■



Mobotix's high-resolution IP-based cameras contain Linux-based computers with software designed to store video footage triggered by motion detection, rather than streaming it continuously to a server for processing.

Department of Alcoholic Beverages (UDABC) and the Department of Transportation.

The Department of Transportation owns 700 miles of fiber-optic cabling that among its other uses, streams traffic from 445 analog cameras from several manufacturers including Pelco, back to a central data transportation monitoring center in Salt Lake City.

Richard Manser, the department's specialist for intelligent transportation systems, says the agency is halfway through converting analog video streams to digital through hardware upgrades, decoders and changes to its Transcore management application to support IP-based monitoring.

"IP Ethernet is much more flexible," Manser says. "Analog requires dedicated fiber strands for each group of eight cameras. The cameras are streaming all the time and tying up bandwidth, typically 4.5M to

TECHNOLOGY UPDATE

■ AN INSIDE LOOK AT TECHNOLOGIES AND STANDARDS

DRM vs. ERM: battle to control data

BY ED GAUDET

Over the past three years digital rights management and enterprise rights management have gained attention due to copyright issues involving digital media and leakage of sensitive data. Unfortunately, the terms are often used interchangeably even though they mean different things.

DRM and ERM share common technical concepts, such as encryption to control access to data and application- or device-level functionality to control usage. But DRM focuses on securing static content tied to a per-user access and usage license, while ERM focuses on controlling dynamic content tied to a business process that users may come in and out of on a regular basis. ERM enables companies to extend security to third-party partners, suppliers and customers.

Here are a few more key differences:

- Content monetization vs. life-cycle control: DRM restricts the access and use of digital files; its business problem is optimal monetization of digital content while protecting the interests of copyright holders.

Today, this content is in the form of music and video files. The goal is to restrict content access to its owner, which is an individual consumer. By contrast, ERM controls access to and usage of electronic data in various formats such as word processor documents, spreadsheets, e-mail, PDF files and CAD diagrams. ERM allows for persistent control of content (regardless of where or when access occurs) and enables an enterprise to control access to intellectual property or other

Enterprise vs. digital rights management

	Enterprise rights management	Digital rights management
Content type	Dynamic. ERM operates in a collaborative environment by handling multiple users with different access and usage rights.	Static. DRM is focused on securing one document or media file at a time, with the goal of mass distribution in a noncollaborative environment.
Business case	Information protection for the entire life cycle of information from creation to archiving with complete auditing and reporting.	Content monetization through the controlled access to digital content. Used primarily by the originators/distributors of content to sell information or media.
Infrastructure	Actively updates users' rights as collaborative environments change. Client machines interact with policy servers that distribute and update rights.	Controls access rights through proprietary devices and file types. Rights are not designed to be transferable or updated.
User experience	Flexible interface is imperative for successful implementation and user adoption.	An easy (if not transparent) user experience is required to gain market adoption. Users are not expected to change or edit the content.

confidential business information that needs to be secured for privacy, competitive or compliance reasons.

Unlike DRM, which tends to deal with static and published content (one song to one consumer), ERM focuses on controlling information throughout its life cycle, and that life cycle is often highly collaborative.

- The ecosystem and technical implementations differ: Both approaches include the notion of a policy server in which rights are defined, an encryption mechanism that controls access to the data, and a software client or device that enforces the policy (which authenticated user has what rights based on content).

DRM tends to focus on the media format and device, with the two most common systems offered by Apple and Microsoft. Apple's FairPlay software is exclusively tied to the encrypted Advanced Audio Coding format, iPod media player and the iTunes online store. Microsoft is more open with Windows Media DRM in that it licenses components of the DRM platform to other vendors for use.

With ERM, the controls are tied to the native applications, which have the ability to produce and consume protected data in several formats. For example, Microsoft Word supports a number of file formats (.doc, .txt, .xml, .dot, .rtf, .wps, .htm and

.html). ERM enablement is accomplished with a provider's software developers kit (SDK) and associated APIs and delivered using one or more of the following approaches: natively by the application vendor, through a plug-in or by an ERM integration agent that leverages the strength of the SDK approach with the flexibility and time to market of a plug-in.

ERM solutions with SDKs include Microsoft's Rights Management Services and Adobe's Policy Server. ERM vendors by acquisition include EMC and Oracle, which use plug-in approaches to application enablement and do not offer an SDK.

Each approach has its advantages and disadvantages; however, only the integration agent provides cross-application control such as secure clipboard, the ability to support all of an application's file formats interchangeably, and enterprise-class management of multiple applications, which simplifies distribution, upgrades and integration.

As a steward of customer and corporate data, understanding the difference between the often controversial digital rights management and enterprise rights management is critical to your organization's agility and long-term success with controlling electronic information.

Gaudet is vice president of product management and marketing for Liquid Machines, which provides an ERM system that supports out-of-the-box integration with Microsoft's RMS. He can be reached at egaudet@liquidmachines.com.

Ask Dr. Internet

By Steve Blass

What steps can I take to protect my systems from zero-day vulnerabilities in Microsoft Word?

Microsoft recommends not opening suspicious Word documents from untrusted sources. This is always good advice but can be difficult to implement successfully given the level of business correspondence delivered as Word documents and the ease with which e-mail addresses can be spoofed. Patches do not appear to be scheduled for release

until January at the earliest.

One option for home users is to switch to the OpenOffice suite (free from OpenOffice.org). Business users may want to accelerate their plans to upgrade to Office 2007, which reportedly is not vulnerable. IT departments may want to make sure they are deploying desktops under a least-privilege security model rather than giving desktop users local administrative rights. This can slow down the code-dropping payloads in infected documents, as they may not be able to infect the registry without

administrative access. The best defense is a tightly restricted outbound firewall on the desktop systems configured to block everything that is not expressly permitted.

Being prompted for every new outbound connection is annoying but can be effective in identifying when your computer suddenly wants to talk to a new server on a new port number.

Blass is an IT manager in Phoenix. He can be reached at dr.internet@jschnee.com.



GEARHEAD

INSIDE THE NETWORK MACHINE

Mark Gibbs

Sometimes life gets too interesting. That's when you blow a day tracking down some weird, esoteric issue, which was exactly what happened to us a couple of weeks ago after a story (see www.nwdocfinder.com/6533) was posted in Gibbsblog.

The post concerned the surprising appearance of a warning by Firefox that a certificate had been presented by a Web site and the certificate's issuer (otherwise called the certificate authority) was unknown. This

meant the certificate couldn't be verified, which meant that the site couldn't be trusted, hence the warning.

This was odd because the certificate in question was for the Navy's Warfighter Response Center (www.nwdocfinder.com/6534) and the issuer was the U.S. Department of Defense. The problem was that the page actually requested was a Google search result rather than the Navy site. As the search term entered into Google had been "binary explosives" it seemed plausible that some kind of monitoring was going on.

*<aside>*The reason we were looking for "binary explosives" was to find a story written just after the recent security brouhaha over passengers carrying liquids onto aircraft. The story in question was from *The Register* (www.nwdocfinder.com/6535) and is a "must read." *</aside>*

Unfortunately, as interesting as being monitored might

have been, the idea of some kind of conspiracy between Google and the Defense Department to watch what people search for was unlikely for two reasons.

First, would the spies show their hand by allowing an authentication certificate to load? Hardly. Second, could such a conspiracy remain hidden? Of course not.

Anyway, another question remained: How was it that a Web page for the Navy was being loaded when a page of

Precaching . . . speeds up the loading of Web sites.

Google results was being returned? The answer? Precaching.

Precaching (also called prefetching) is a technique used by the Firefox browser to speed up the loading of Web sites. If the feature is enabled, when a Web page is loaded the URLs in the page are collected. The browser then launches multiple threads and the contents of each of those URLs are loaded into a cache before you might ask for them.

What was happening in this case was one of the entries returned by the search was https://wrc.navair-rdte.navy.mil/warfighter_enc/weapons/ordnance/types.htm, and because it is an Secure-HTTP connection the site presented its certificate when the precaching subsystem tried to access the page. As the Defense Department isn't included in Firefox's list of certificate authorities by default, and because we were configured to see the warnings, that's what

happened. Except the precaching wasn't done as we thought by Firefox.

To test whether this was the cause we switched off Firefox's precaching. Then we purged the cache and cookies and tried the search again. The warning happened again!

We're sure that some of you have, at this point, had an "ah-ha!" moment and know the answer. We didn't. We tried to figure out what was going on and did things like run Capsa (the subject of Gearhead two weeks ago) and trapped and analyzed all of the HTTP and Secure-HTTP traffic.

This didn't solve our problem, and we found unexpected Web sites being accessed by unknown processes (what fun — more to investigate).

Then we had our "ah-ha!" moment: The precaching was something that a Firefox plug-in was doing! The culprit was Fasterfox (www.nwdocfinder.com/6537) an add-on that blocks pop-ups, times how long it takes to load pages, tweaks a whole range of network and browser rendering settings, as well as precaching.

We switched Fasterfox off and no more certificate warnings.

Precaching might sound like a good idea but it has a number of downsides, such as increasing bandwidth use, increasing server loads, and it can preload content that you might not want to have loaded, which sounds like a lawsuit waiting to happen.

What's your time sink? Tell gearhead@gibbs.com or on Gibbsblog.

Cool Tools

Quick takes on high-tech toys. **Keith Shaw**



Wrapping up the year with some odds and ends as I get ready for the onslaught of new cool tools in January 2007:

The scoop: Store 'n' Go Corporate Secure USB Drive, by Verbatim, about \$80 (1GB version tested).

What it is: This USB flash drive is designed to protect data by using mandatory security features, including hardware-based Advanced Encryption Standard data encryption and antitamper password protection. Unlike USB devices that have optional security features, these are required with this Verbatim drive. The company says the device features an SHA-1 hashing algorithm that ensures the password in raw form is not stored on the drive's memory, preventing it from being lifted from the device or the memory. To protect against dictionary or brute force attacks, the drive will enter lockdown mode and secure erase all the data after 10 consecutive failed logon attempts.

Capacities range from 1G to 4GB (about \$270), and the device is compatible with mSystems' mTrust enterprise security software (which can help organizations centrally manage the devices).

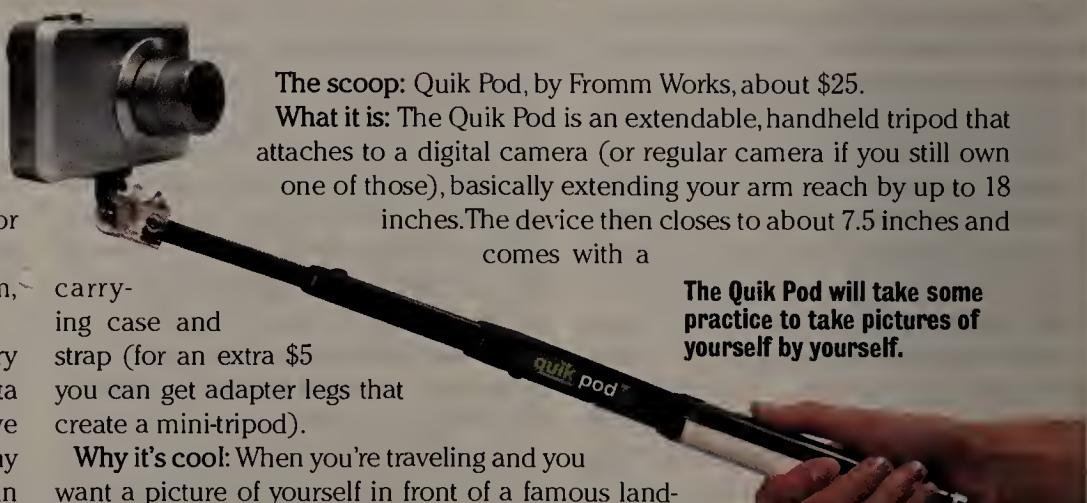
Why it's cool: Companies that have been afraid to support the use of USB flash drives for mobile workers can feel more secure that the data won't be compromised. In all likelihood the mobile workers are already using USB drives, so why not be sure

that the data is more secure by trying these mandatory security features? Setting up the drive was very easy, and a complex password requirement means your users can't pick easy passwords (like their dog's name).

Grade: ★★★★



This USB flash drive makes the data for mobile users more secure.



The scoop: Quik Pod, by Fromm Works, about \$25.

What it is: The Quik Pod is an extendable, handheld tripod that attaches to a digital camera (or regular camera if you still own one of those), basically extending your arm reach by up to 18 inches. The device then closes to about 7.5 inches and comes with a

The Quik Pod will take some practice to take pictures of yourself by yourself.

carry-ing case and strap (for an extra \$5 you can get adapter legs that create a mini-tripod).

Why it's cool: When you're traveling and you want a picture of yourself in front of a famous landmark, you often have to ask strangers to take your picture or do the "hold the camera out as far as possible" maneuver. With the Quik Pod, you don't have to ask for a stranger's help, and you get a better image than the arm-length move. By using the automatic timer function on the digital camera, you can set up the shot, push the button and then extend the Quik Pod and take a shot. In addition to horizontal shots, you can adjust the device vertically — useful for taking photos at parades or other events where someone taller is standing in front of you. If your videocamera supports a tripod connection, you can attach it to the device as well.

Some caveats: Because the point of the device is to take photos without someone else's help, determining whether the shot you took was a good one or not is a crap shoot. It could take some practice before you figure out the proper angle to hold your arm, the proper length to extend and whether the landmark is in the shot or not.

Grade: ★★★★

Shaw can be reached at kshaw@nww.com. New Cool Tools video every Thursday, and Twisted Pair podcast every Friday at www.networkworld.com.



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*Price does not include hard drives. A minimum of two hard drives is required. All prices are IBM's estimated retail selling prices as of October 4, 2006. Prices may vary according to configuration. Resellers set their own prices so reseller prices to end users may vary. Products are subject to availability. This document was developed for offerings in the United States. IBM may not offer the products, features or services discussed in this document in other countries. Prices subject to change without notice. Contact your IBM representative or IBM Business Partner for the most current pricing in your geography. 1 Denotes raw storage capacity; usable storage capacity may be less than stated. Capacity stated in uncompressed mode, followed by capacity using data compression technology. 2 Compared to EMC CLARiON CX300 and HP StorageWorks MSA 1000. 3 Compared to HP StorageWorks MSA 1000, HP StorageWorks MSA 1500 and EMC/Dell AX150. 4. IBM hardware products are manufactured from new parts, or new and serviceable used parts. Regardless, our warranty terms apply. Telephone support may be subject to additional charges. For on-site labor, IBM will attempt to diagnose and resolve the problem remotely before sending a technician. On-site warranty is available only for selected components. 5 As compared to other major storage vendors. 6 IBM Global Financing offerings are provided through IBM Credit LLC in the United States and other IBM subsidiaries and divisions worldwide to qualified commercial and government customers. Monthly payments provided are for planning purposes only and may vary based on your credit and other factors. Lease offer provided is based on an FMV lease of 36 monthly payments. Other restrictions may apply. Rates and offerings are subject to change, extension or withdrawal without notice. IBM, the IBM logo and System Storage are trademarks or registered trademarks of International Business Machines Corporation in the United States and/or other countries. Other company, product and service names may be trademarks or service marks of others. © 2006 IBM Corporation. All rights reserved.

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CISCO SYSTEMS





REGULATORY COMPLIANCE

Ben Rothke

Good security can aid compliance

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Rothke is a senior security consultant with INS and the author of Computer Security: 20 Things Every Employee Should Know (McGraw-Hill 2006). He can be reached at ben.rothke@ins.com.



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Whether the al-Qaida threat is construed as physical or cyber is irrelevant, as the defensive means is the same: regular in-depth profiles of the psychology and proclivities of trusted employees to whom we give the greatest access or control. Instead of repeatedly looking outward for threats to our infrastructures, we should be looking within in far more than the current face of political correctness permits. "Trust but verify again and again" applies not only to technology but also to people.

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On Technology

John Dix

Mobilizing the desk phone

One of the interesting things to watch next year will be how the cellular and Wi-Fi worlds collide, and a startup called Divitas hopes to be one of the players in the middle of the action.

Founder and CEO Vivek Khuller says enterprises have done a good job mobilizing office workers by doling out laptops but have ignored one core business asset: the enterprise phone. Despite the ubiquity of cell phones, he contends that 90% of the time the desk phone is still the primary contact point for enterprise workers.

His goal is to make the desktop number portable by extending all the phone's features to the user's cell phone, making it possible, for example, to forward incoming calls to cell phones and dial extensions from those cell phones. Wi-Fi can play a role by helping him do that without driving cellular costs through the roof.

The Divitas product — which Khuller calls a mobile convergence appliance — is a Linux-based device that can be used with programmable cell phones (so-called smart phones) that are cell-only or dual-mode cell/Wi-Fi phones. The latter gives the widest range of options, so we'll focus on that.

When a user is in the office, the appliance routes incoming calls to both the user's desk phone and cell phone. Because the appliance is in constant contact with the cell phone, it can determine if the mobile device can be reached via Wi-Fi, meaning no additional costs are incurred.

If the user is on the road, the appliance determines if the cell phone is available via a Wi-Fi hot spot or if the call has to be routed via a standard cell link. The reverse is true for outgoing calls from the mobile device.

Incoming calls that go unanswered are routed by the appliance to the enterprise voice mail system because that's the number Divitas is trying to mobilize, Khuller says.

But what about when your call is riding the Wi-Fi waves in Starbucks and the guy next to you starts to download a massive file? Khuller says the appliance constantly evaluates the quality of the link and, in the event of degradation, seamlessly hands off the call to cellular. Khuller says it is noticeable by minimally invasive.

Regarding ROI, Khuller says many users make half their cell calls from their offices. So for a customer with 3,000 cell minutes per month, if half can be completed at 1.5 cents per minute using Divitas vs. the average of 7.5 cents per minute for cell calls, the ROI is three to four months, including the \$300 for the smart phone.

The Divitas product is scheduled to be commercially available in the first quarter. Interesting stuff.

— John Dix
Editor in chief
jdix@nww.com

Opinions

Broadband router realities

I enjoyed Kevin Tolly's column on broadband router throughput (www.nwdocfinder.com/6398) and found it quite true to my own experiences. Reliability might make a good topic for a future column. I have used Linksys for my home office for many years and have scrupulously kept my firmware up to date. Unfortunately, either the hardware or the firmware has a problem Linksys does not acknowledge and will not do anything about. Fairly frequently (once or twice a day sometimes), I need to power-cycle the router to get an Internet connection through my cable modem.

For whatever reason, the router just hangs up. Linksys support has sent me revised setup instructions for Comcast cable installations and I have gone through the pain of resetting all the parameters and port configurations, but it didn't help. I even keep the router away from equipment generating heat just in case.

At home this is an inconvenience, but when I try to access my home systems remotely via GoToMyPC or Slingbox, it's just impossible. I'm now looking into routers that can handle multiple WAN connections. Hopefully their reliability record is better.

Steve Markman
CEO and technology consultant
Venture High Consulting LLC
Los Gatos, Calif.

Thanks to Kevin Tolly for shining some light on the issue of broadband router performance. I had the interesting experience last year of removing my router and operating directly attached to my cable modem. The performance was spectacular — about 10 times faster without the router box slowing things down.

Tolly didn't address the latency issue; I hate to think how much the router delays the packets. I also suspect (but can't prove) that my router, an inexpensive Linksys box, has a memory leak and slowly degrades over a three-to-four-day period. I'm now in the habit of power-cycling the router every few days. I'd be interested to read Tolly's opinion, or even a *Network World* test, of the better broadband routers and how much you have to pay to get decent performance.

Peter Thornton
Annapolis, Md.

Regarding broadband routers, here's another perspective. I've had DSL at home since 1999 and had an ancient Alcatel 1000 DSL modem terminating my DSL line. Although the line was rated 1.5Mbps, I never saw throughput better than 700Kbps on it. After communicating with a tech on the DSL forums, I installed a newer DSL modem on the line, configured it and am now getting a consistent 1.25Mbps connection. That's a 500Kbps increase for \$20 spent on a second-hand unit from eBay.

It's not just the router but all the components in the system that come together to limit or maximize throughput. I swapped out my old SonicWall firewall when I replaced my modem. While it was rated to handle more than that rate of traffic, it was time to step up to something a little more robust and flexible. I put in a Cisco PIX 501 to get more headroom and a decent VPN. Again, not expensive, but not a Sunday ad special, either.

Matthew Leeds
Vice president of operations
Gracenote
Emeryville, Calif.

E-mail letters to jdix@nww.com or send them to John Dix, editor in chief, Network World, 118 Turnpike Road, Southborough, MA 01772. Please include phone number and address for verification.

Readers respond Find out what readers are saying about these and other topics.
www.nwdocfinder.com/1030





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CLEAR CHOICE TEST

Old backup standbys show their strength in test

But newcomers make it interesting with fresh features

BY TOM HENDERSON AND LASZLO SZENES, NETWORK WORLD LAB ALLIANCE

Enterprise backup-and-restoration products have grown sophisticated as they've been forced to accommodate a variety of operating systems and hard-disk filing systems, incorporate security parameters, and produce audit trails sufficient to meet compliance regulations.

We tested nine products designed to relieve the long-standing drudgery of backing up enterprise systems and to take on the newfound challenges of securely and compliantly protecting data. Among the candidates, we found that an old standby, Symantec's Backup Exec, stands above the others for consistent backup and restoration in a variety of situations. Symantec was followed very closely by HP's OpenView Storage Data Protector, which has excellent core usability. However, Acronis, Atempo, Avamar (bought by EMC during the testing cycle) BakBone and Yosemite Technologies made competition difficult, as each was able to accomplish server, client and branch backups and earned extra credit for usable security, audit trails and support for bare-metal machine cloning.

Much emphasis is placed in today's backup world on specific applications. Transaction-oriented, high or rapid data-delta applications, such as Microsoft Exchange, Microsoft SQL Server and Oracle databases, have a crop of products poised to provide high availability specifically for them. The

availability of application-specific data is accomplished through various methods that effectively mirror transactions into disparate computing hardware. This focus doesn't seem to pay attention to the fact that enterprises often use a sophisticated mix of off-the-shelf applications and internally developed programs groomed to support a variety of operating systems.

Most of the backup products we examined have transaction application backup modules or suites available as extra-cost options. However, we did not test those options because this evaluation centers on testing several generic (meaning non-application-specific) backup applications in an emulation of a corporate site-with-branches environment (see "How we did it," below).

Here is a product-by-product breakdown of our testing.

Acronis True Image Enterprise Server

True Image Enterprise Server (we tested Version 9.1) is a data center-focused client/server application that supports

How we did it

We built a network consisting of an emulated central site (a data center), which was connected to a branch network of several servers, each running the operating system best supported by the hardware. The central site server was an HP DL140 with 1GB of RAM and an Intel Xeon processor, running Windows Enterprise Server 2003 or SUSE Linux 10. Available servers for branch testing included an Apple Xserve G4 running Mac OS 10.4.7, a Sun T2000 server running Solaris, or HP DL140 boxes running SUSE Linux Enterprise Server 10 or Windows 2000 Enterprise Server and Active Directory.

There were three varieties of branch clients: Windows XP SP2 (on several different machines), Mac OS 10.4.7 (on Apple PowerBook G4 and G4 workstations) and OpenSUSE 10 (on a VMware HP Notebook VM and a Compaq Presario 2.8GHz, Celeron-based

machine). All client machines were connected by a Gigabit Ethernet switch to the branch server.

Two of the products we tested ship to customers with hardware. Avamar supplied Axion for testing on a Dell PowerEdge 2850, and Atempo LiveBackup came running on a Dell PowerEdge 1800 server and a Dell XPS workstation, which ran the management console.

We tested for compatibility within the operating systems we hosted (both client and server), and checked features for enterprise server backup and restoration, client backup and restoration, installation on clients and servers, and the ability to clone both servers and clients to be used in rollout or distribution situations.

We also examined user interfaces for the supported operating systems we used, to check for ease of use, security, consistency, and ability to audit backup-and-restoration logs.

Backup and restoration

a wide variety of Windows and Linux operating systems and CPUs as clients or servers. However, it doesn't support Mac OS, Solaris and other non-Linux, Unix-like operating systems, such as HP-UX and AIX.

Users and administrators can easily restore files. They just need to walk through a wizard, selecting which files they want backed up and restored, and where. This process can be performed even more quickly if the user or administrator adds a local-client drive partition that has the operating-system files necessary to boot the system. Then this system can be booted from this partition to restore a damaged one (or one that won't boot because of viruses, Trojans and so on). After this base-restoration has been accomplished, the rest of the files can be fetched to bring the machine to a more usable state. This method diminishes overall downtime. The downside is that there is no data encryption, though there is some compression that obscures data on network transports as it is being backed up or restored.

True Image's strengths lie in its egalitarian support of most 32- and 64-bit editions of Windows (including NT4, 98 and ME), as well as numerous kinds of Linux (we tested SUSE 10, but Debian, Mandrake, United Linux and others also are supported) through virtually any kind of backup media.

Unlike others we tested, True Image doesn't support continuous backup; therefore, workstations and servers with high data-change rates would not be backed up as often as they should. True Image does support making a bootable disaster-recovery CD/DVD, which lets administrators have hot media to either start restoring machines with disk failures or conduct a bare-metal restoration.

In terms of administration, True Image is very well organized and was one of the most user-friendly products we tested.

For security purposes, True Image allows for archived files to be password protected, but it does not support encryption during data transfer.

In terms of reporting, Acronis produces a log for each backup-and-restoration operation that contains the steps of the action and whether it was successful. But the log does not detail which fields were accessed during the process. The log can be saved in a file, and the system can send notifications of actions via e-mail or as a Windows popup using Windows Messenger Service.

Arkeia Network Backup

Of the products tested, Arkeia Network Backup had the longest lists of supported operating-system clients and storage devices and methods, a testament to Arkeia's background as an early open source backup application, based on Linux. Arkeia touts a long list of supported SCSI tape drives and jukeboxes, as well as Linux and Windows-based network-attached storage devices and a variety of storage-area networks (SAN). These include SCSI tape devices from HP, Exabyte and Maxtor and operating systems from SGI (iRIS), SCO (UnixWare) and Compaq (Tru64).

Arkeia is distinctively Unix-flavored and requires at least a minimal amount of Unix expertise to install, manage and audit. For example, you have to run shell commands and debug error messages if they come up.

Arkeia Network Backup runs as a server only on Linux, AIX, Solaris, IRIX, SCO UnixWare or Compaq Tru64 Unix. It cannot run on Microsoft Windows servers (which can be

See Backup, page 28

The Highly Reliable Times

VOLUME 1 – ISSUE 1



Windows Server 2003



LONDON STOCK EXCHANGE CHOOSES WINDOWS OVER LINUX FOR RELIABILITY



Tom Nagy for The Highly Reliable Times

THE HEADQUARTERS BUILDING of the London Stock Exchange, located in London's Paternoster Square.

LESTER SPEAKS OUT:

"We looked at a number of different platforms for our Technology Roadmap, and we lined up our business requirements with the capabilities of those platforms, and Windows Server was the clear choice."

*—David Lester, CIO,
London Stock Exchange*



Reliability Is Key in the "World's Capital Market"

By MICHAEL BETTENDORF

LONDON, Oct. 2006 — When an IT system must process 15 million real-time messages per day, with peaks at 2,000 messages per second, even one second of downtime counts. That's the pressure the London Stock Exchange faced when building Infolect, the Exchange's real-time stock-ticker information delivery system.

The solution had to have rock-solid reliability, nothing less. "Reliability is one of the key attributes of the Exchange in its technology systems. These systems have to work every day, 24/7, to make sure the markets are there," said CIO David Lester, who evaluated both Linux and Microsoft® Windows Server® 2003 for the Exchange's core tech-

nology systems. "We looked at a number of different platforms for our Technology Roadmap, and we lined up our business requirements with the capabilities of those platforms, and Windows Server was the clear choice."

In Lester's view, long-term reliability is a function of a solid relationship: "We wanted a deep partnership with an organization that could deliver the kind of mission-critical technology that we needed, and we felt Microsoft delivered just that."

For the full London Stock Exchange case study, plus other case studies and independent research findings on the reliability of Windows Server versus Linux, visit us at microsoft.com/getthefacts

BREAKING NEWS: London Stock Exchange Achieves Record Reliability

David Lester, Chief Information Officer of the London Stock Exchange, cites Windows Server as key to maintaining system reliability and performance. — *Continued on Page B3.*

NetResults

NETWORKWORLD
CLEAR CHOICE

Product	Backup Exec	OpenView Storage Data Protector	NetVault	LiveBackup
Vendor	Symantec	HP	BakBone	Atempo
Price	\$1,490*	\$2,780* Windows and Linux.	\$1,705*	\$25-\$75 per seat, based on volume.
Pros	Quick systematic backup and restore; offers ability to restore Windows image to different machine; Windows and NetWare.	Built for large-scale deployment; offers support for large number of operating systems.	Outstanding operating-system and media support.	Continuous backup capability; easy restore for users.
Cons	Complicated licensing procedure.	Very complex; steep learning curve; security measure not turned on by default.	Difficult bare-metal restoration.	Windows only; slightly complicated server installation.
Score	4.25	4.13	4.0	3.9

Product	True Image Enterprise Server	Axion	Asigra Televaulting	Yosemite Backup	Network Backup
Vendor	Acronis	Avamar (acquired by EMC)	Asigra	Yosemite	Arkeia Software
Price	\$1,320 as tested; server and four clients.	\$26,500*	\$11,250*	\$3,250*	\$2,050*
Pros	Makes a bootable disaster-recovery CD/DVD; strong Windows and Linux focus.	Single-instance storage; fully searchable backup.	Uses bandwidth effectively for WAN backups; single-instance storage conservation.	Easy installation; scalable.	Wide operating-system and tape support.
Cons	Weak operating compatibility.	Complicated setup; poor support for bare-metal restoration.	Weak support for disaster recovery.	Weak security; no default encryption of data, inadequate support for bare-metal restoration.	Not easy to install; tape-oriented backup.
Score	3.85	3.7	3.6	3.55	3.23

NETWORKWORLD BUYER'S GUIDES

Research your backup and recovery options
in the Network World Buyer's Guide.
www.nwdocfinder.com/1034

*Readers are cautioned to check pricing for their specific environment; prices quoted for two Linux/Windows servers and one each: Windows XP, MacOS, and Linux workstation (where it was compatible).

The Breakdown	Acronis True Image	Atempo LiveBackup	Asigra Televaulting	Arkeia Network Backup	Avamar Axion	BakBone NetVault	HP OpenView Storage Data Protector	Symantec Backup Exec	Yosemite Backup
Backup/restore usability 40%	4	4.5	3	3	4	4	4.5	5	4
Administration/management /features 30%	4.5	4	4	3	3	4	4	4	4
Security 15%	3	4	4	3	4	3	3.5	3	2
Compatibility 15%	3	2	4	4.5	4	5	4	4	3
Total score	3.85	3.9	3.6	3.23	3.7	4	4.13	4.25	3.55

Scoring Key: 5: Exceptional; 4: Very good; 3: Average; 2: Below average; 1: Subpar or not available

Backup

continued from page 26

clients and media servers, but not administrative servers). Installation is somewhat more difficult than average, though the supplied documentation gives very useful, operating-system-specific installation tips. Uninstallation on non-Windows platforms must be done manually because there are no scripts or routines to do so.

We were concerned about security when we found that the Arkeia administrative GUI required us to run as root on a client or server to access Network Backup functionality. The GUI is highly flexible, letting administrators add specific storage options, such as drive types and tape sets, as target backup systems. Arkeia has no native encryption for data sent across network transports, though client-side encryption is available at extra cost. In this option, encryption key management is left to the administrator, who must find a method of key storage and policy — without the keys, the backups are useless.

Procedurally, Arkeia Network Backup uses a backup

server, a media server and clients. The backup server keeps track of where files and sets of files are stored, while the media server is a targeted storage pool fed by tape or disk storage. Arkeia permits multiple streams of data to be backed up from clients to optimize backup speed, though we found little real difference in overall backup speed when we used multiple streams. Continuous-backup types (for example, immediate file delta backup invocation) aren't supported.

Logs are kept of messages concerning all processes, and they can be viewed in different degrees of detail, but we found no option to save them to a file.

Arkeia's administrative GUI, especially on Linux, often was difficult to use. It would appear to freeze for a time (seemingly processing), then reemerge to do more work. However, Network Backup does have installation and administrative consistency across the platforms it supports.

Asigra Televaulting

Asigra's Televaulting takes a different approach to back-

up-and-restore processes in terms of the relationship between user or server hardware, backup storage devices, and overall process management. Asigra backs up files through a gathering (backup) and distribution (restoration) local data-collector server called DS-Client, which resides on a local network and is controlled by an application called DS-User. The DS-Client master backup server, called the DS-System, is controlled by yet another application called DS-Operator. DS-Operator manages DS-System and also performs system accounting (such as charging accounts for disk storage, creating limits on storage, bandwidth throttling by clients, and other administrative features). DS-Operator's features are handy to internal IT departments that charge for their services, as well as third-party backup service providers.

Overall, this method was slower, because there were no clients on the machines that would do optimization and caching, but the product relies on the operating system's algorithms. In addition, network traffic is higher because there is no compression.

DS-Client runs on various platforms, but the choice of the platform is important. Because DS-Client will pull or push information based on its ability to log on to a server or user machine, its capabilities must match those of the intended server or user machine. For example, when DS-Client is hosted on a Windows machine, it can back up Server Message Block — Microsoft's early network connectivity methodology — or SAMBA-connectable machines through standard SMB user name-password combinations.

DS-User doesn't load agent software on a client that needs backup-and-restoration services. Instead, DS-User sets up the DS-Client application to log on to a user's machine or a network server using standard network credentials specific to the machine or server under control. Backups or restorations then are authenticated with encryption methods that vary from Data Encryption Standard, to Advanced Encryption Standard (AES) (128-, 192- or 256-bit). The encryption keys are stored — dangerously — on the client, if they aren't remembered during stressful situations, data will be lost forever. Fortunately there's only one key per client server.

Also, we found that although Asigra says its product easily allows for bare-metal restoration, we found the process difficult, because the initial operating-system files must be placed on a crippled server or workstation before a restoration mission can begin.

In terms of reporting, this system keeps detailed (but not file-level) records of each transaction and keeps a system-event log (which tracks logons and connection openings and closings). We could view the logs easily, but found no way to export the logs to a file format.

Televaulting requires that more initial administrative time be spent upfront to populate user credentials and assign backup sets and perform traffic management for backups. On the plus side, it has good security.

Atempo LiveBackup

LiveBackup is a hybrid application that performs continuous backups and makes system snapshot files. Strictly captive to Microsoft platforms, Atempo uses MS SQL Server 2000 (included) to keep track of backup client-system data movements. It's fast — it made a snapshot of our system in a matter of minutes — and provided a desirable negligible load on client performance while it was backing up continuously. Where there's a lot of continuously changing data, a fast pipe to the server (such as a symmetrical broadband connection) is recommended to ensure the lowest delta in the backup data set.

LiveBackup was tougher to install than normal in this test, and the client-side application can't have its installation options (such as the IP address of the server and the system name of the client) changed without the client application being uninstalled and reinstalled. This shouldn't be difficult for static situations, where nothing changes, but we don't like to bet on those. We also had to do additional installation tasks that might stump some, such as configuring the MS SQL Server to start in the host server system — something Atempo could have done easily by supplying an installation script.

It's otherwise easy to understand and navigate backups from client to server, whether you're an administrator or a slightly savvy user. A LiveBackup 128-bit cipher encrypts data backed up from client to server on the wire (or through the air or whatever the network transport is). VPN connections must be arranged and deployed outside of the LiveBackup deployment if they're needed for remote users. Unfortunately, LiveBackup doesn't do machine cloning or load software on new machines for internal distribution as easily as other products we tested.

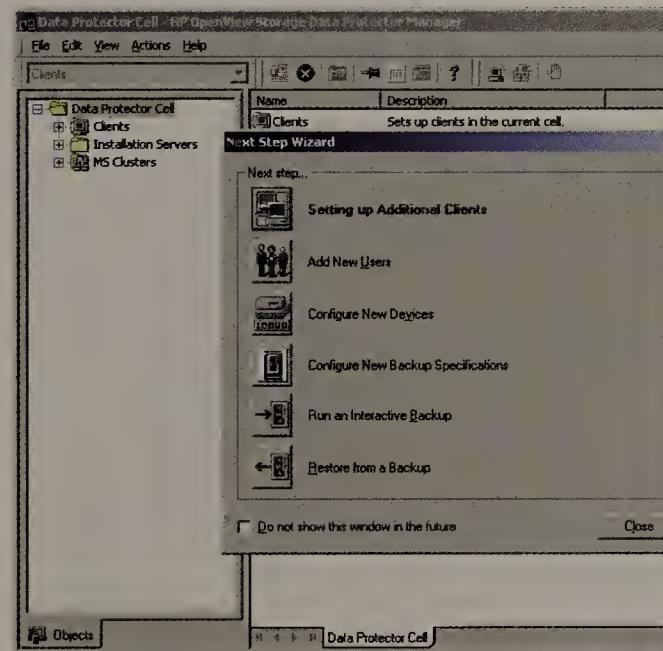
It's possible to let a server-stored LiveBackup DVD/CD set restore a failed system in the field. This is very helpful in

cases where a remote worker's machine has a hard-disk failure of some kind. The user could take the LiveBackup DVD/CD media, after having remedied the hard-disk failure, and use it to replace lost data or request a simple disk overwrite to do a bare-metal restoration.

LiveBackup is a hard-drive and SAN-focused storage system, and the word "tape" does not appear in its documentation. This means that multiple iterations of data will require an online, rapidly accessible, drive-based infrastructure for storage. Therefore Atempo's usefulness in providing rapidly restorable data is offset by the need for large data stores at the LiveBackup server. LiveBackup conserves media by using single-instance technology, meaning that only one instance of a file is stored (unless it is changed, creating another instance). The payoff can be very rapid restoration of information where the platform is homogeneously Windows-based.

For security, LiveBackup by default uses a 128-bit cipher for data transmission.

On the reporting front, LiveBackup generates rudimentary reports on such activities as how many backups, restorations and rollbacks particular users did. These statistics are stored in a database that has archiving as an option.



HP's OpenView Data Protection Manager got high marks for its usability because it can be driven by wizards that are especially useful given the highly sophisticated processes allowed by the product.

HP OpenView Storage Data Protector

HP's OpenView Storage Data Protector is the tip of the iceberg for a wide variety of HP storage applications. HP's backup-and-restoration philosophy is similar to that of most of the other products tested, where online (disk and SAN-based) storage — as opposed to near-line (tape and mountable media) storage — produces faster restoration results. Storage Data Protector supports a generous variety of tape and SAN media, and while it supports HP's operating systems and older versions of Linux and Microsoft Windows systems, it was notably bereft of support for Apple's Mac OS.

The installation of HP's products was by far the most difficult of the products we tested, but that was caused in part by its numerous setup options. Storage Data Protector puts comparatively deep connectivity and backup and restoration options into place during installation, putting devices into cells, where a Cell Manager application is installed as the main backup server for the domain. Storage Data Protector's internal proprietary database keeps track of where files are, to whom they belong, and what interation

or form they have.

The GUI, which is available to administrators and users with the authority to access backup files, communicates with the Cell Manager, which can run on Unix or Windows systems. The client-side GUI is sensitive to DNS settings, which could produce unusual error messages if the DNS is incorrectly configured. In turn, each client needing backup-and-restoration services has a backup or (for specific applications such as Exchange or SAP) application agent software installed. Clients with backup storage devices attached also have a media agent installed that's controlled by the Cell Manager.

The Cell Manager also serves as an Installation Server, holding various applications for either Unix or Windows systems, and two separate servers are needed if both operating system platforms are to be supported by Storage Data Protector. The cells that are developed for backup-management purposes are managed by a manager-of-managers GUI that sends signals from a two-tier hierarchy (data center and branch cells) to manage backups remotely.

Our branch simulation showed the potential benefits of cellularlike management via the manager of managers methodology. It's tougher to set up initially and requires planning, but should pay handsomely in administrative benefit.

We were dismayed to find encryption and compression turned off by default, but at least they're available. There's also no rapid-restoration methodology available unless it's purchased as a separate "Enhanced Automated Disaster Recovery" module.

HP offers four levels of logging capabilities. The highest level logs every detail in every file. The next level logs basic file information. The third level logs only directory information. The last level is no logging at all. The product's reporting capabilities focus on administrative and performance-monitoring information. These reports can be scheduled and delivered via e-mail, SNMP and Windows messaging, or written to a file.

Avamar Axion (now EMC)

Axion has a unique, appliance-based approach to backup. Inside the Linux-based appliance, which comes outfitted with 1.5TB of storage space and supplies RAID 5 data protection, is the Axion application, complete with its own filing system. Axion uses single-instance storage to conserve space among all of the clients that use the appliance for backup and restoration. The appliance approach does speed up restorations, because all storage is in-line.

Clients access the Axion appliance to download client-side backup applications specific to their operating system. Axion's backups are both incremental (changed files) and system snapshots. Axion supports Microsoft Windows (NT and later), Linux (Red Hat versions 7.3 and 7.4 and SUSE SLES versions 8 and 9), Solaris (versions 7 to 10), HP-UX (versions 11 and 11i) and AIX (versions 5.1 to 5.3) — but not Mac OS X. A Java client for each version is also downloadable.

The files in Axion's server appliance are stored within a proprietary filing system called Avamar File System (AvFS), which provides indexing and a rapid-search engine. The indexing takes place according to a schedule, rather than in real time. AvFS can be searched Google-style with search strings, letting a full backup database be searched easily and randomly for security or other reasons.

The Web interface that runs Axion doesn't support the Firefox browser fully (a plug-in must be added in versions 1.5 and 2.0) and doesn't support browsers based on KDE (Konqueror) and Apple Safari, making it difficult to use for certain Linux and Apple clients. We had the best success with Internet Explorer versions 6 and 7.

Although Axion doesn't perform bare-metal restoration, it

conducts rapid restoration once a machine establishes connectivity. It does this by knowing a machine's total file-history delta and then restores on demand only the files it knows have changed. This unique method assesses the current state of a client needing restoration, compares it with a file history of the client and restores only the files that differ between the current and desired state of the machine.

On the security front, Axion offers proprietary or AES 128-bit encryption for data transmissions, and has in place user-access control to stored data.

Logging is available through a command-line interface. There is also good reporting support in the administrative GUI that provides such pertinent information as a listing of client activity in a specified period.

We liked the appliance method used by Axion and found it to be useful if immature compared with the features of the other backup products we tested. A downside is that larger enterprises may well use numerous appliances, even if they can be added in a modular fashion.

BakBone NetVault

BakBone's NetVault Enterprise Edition supports enterprise backup-and-restoration functions for the majority of hosts and clients we tested, missing only SGI IRIX and SCO UnixWare. It also supported every type of backup media that we used in testing. The vendor supplied a long list of applications it backs up and restores for a price, including Oracle, MySQL, Lotus Notes, Sybase, VMware/ESX and SAP.

NetVault provides two main administrative applications with its general system, Configurator and the NetVault GUI. Configurator sets logging levels; sets up ports for communications among clients and storage devices; schedules jobs; and sets tuning parameters and details for backup, restoration and infrastructure for these.

The NetVault application performs simple, full or incremental backups. It can have additional memory buffers assigned in the server, a feature that has a decided impact on performance — more buffers render faster backup throughput. The NetVault documentation provides good details on how to tune performance for speedier backups. NetVault 7.4 uses compression, but supports encryption only in an add-on module.

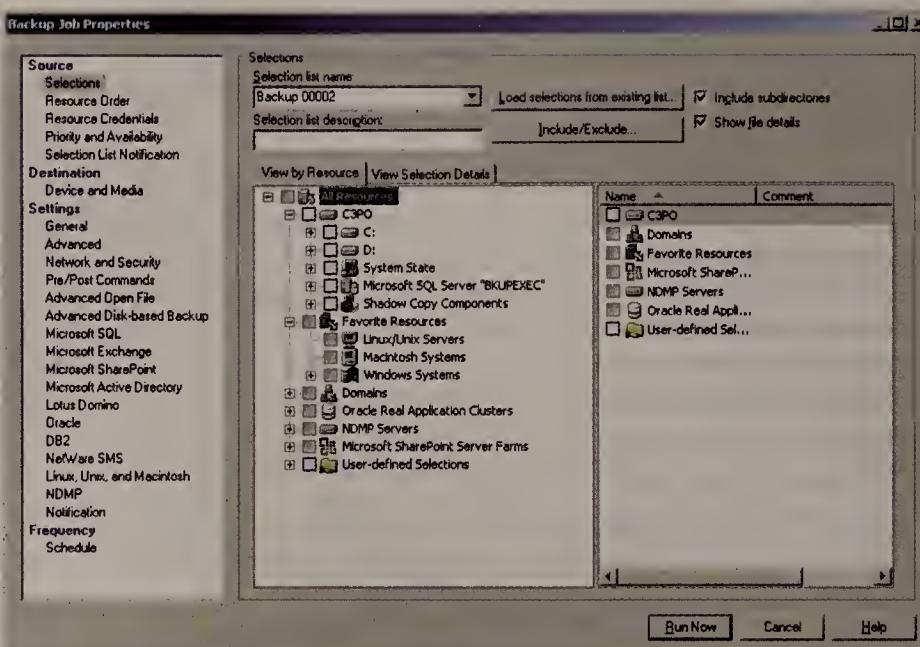
It was simple to manage backups and restorations across the platforms we tested. NetVault doesn't provide for cloning machines and also doesn't make available a rapid-restoration methodology in case of client hard-disk failure. This means that the case of failure, clients, whether workstations or servers, must have an initial operating-system restoration and must download the NetVault client software before they can have data, applications and settings restored, a process that adds significantly to the unavailability of a disaster-stricken machine.

NetVault records the details of each job — when it was run, by whom, and its success or failure. It also maintains a security log of authentications that can be exported to a file. Additionally, you can create customized reports and send automatically generated reports via e-mail.

Overall, BakBone NetVault gets credit for its breadth of platform coverage, but it isn't as useful as the other products tested in terms of rapid restoration of a platform from a disastrous circumstance.

Symantec Backup Exec

Symantec Backup Exec (we tested Version 11d) supports enterprise network infrastructure very broadly. Tracing its



Symantec's Backup Exec's administrative application allowed us to rapidly drill down to any activity we wanted to complete.

history through Symantec, Veritas, Seagate and Arcada, Backup Exec is the oldest product we tested, and its maturity shows. Although it didn't have the widest support for servers (it does not support HP-UX, IRIX, AIX and SCO), it does support MacOS and most flavors of Linux by way of client agent software.

Installation is simple, both on servers (Backup Exec 11d is hosted on Windows 2000 Professional, Windows XP SP2, NetWare or Windows 2003 Server editions) and clients. Our only complaint was the number of license key digits that had to be entered seemingly constantly until all was alive. Backup Exec supported file or snapshot-based backups, allowing administrator and user-defined backups and restorations. Individual disk partitions also can be backed up, providing good flexibility. We do need to note that Network File System partitions aren't supported.

Among the products we tested, Backup Exec pays a great deal of attention to detailing the type of data to be backed up (files, directories, partitions, snapshots, entire systems), and this effort pays administrators and users back by giving them extremely flexible restoration options.

One of the strongest features of Backup Exec is that it lets clients boot a Symantec CD and have the applications on the CD find the Backup Exec software server and perform a partial or complete restoration of files. Civilians can do this for any of the operating systems supported.

We were dismayed that encryption wasn't turned on by default, but that's easily changed. The encryption options are good: AES 128-, 192-, or 256-bit encryption are available. The keys are stored in the server. We recommend backing up the encryption keys database frequently and removing it to a safe location off-site.

Continuous backups ostensibly are available, provided there's sufficient server disk storage and minimal latency between client and server. The problem with the Symantec approach is that continuous backup is effective only when the source device has a low delta of change.

The Symantec product keeps detailed audit logs in its database for a configured length of time. This log, which can be saved to a file, displays the date and time of an activity, who performed it and its nature.

Keeping network administrators, help desk support people and users in mind, we ranked Backup Exec the best in overall effectiveness for its features, security and usefulness in rapid restoration when disaster strikes.

Yosemite Backup

Yosemite is geared to a file-based backup methodology

and tape storage, though hard drives are perfectly acceptable storage media. Yosemite's strength is its ecumenical, cross-platform operating-system support (though not the widest support among products we tested). Yosemite makes a Microsoft Small Business Server edition, (then a Standard, the version we tested) and advanced server (geared to support more than 20 servers). Yosemite installs as a server application on Microsoft Enterprise Server editions (Windows NT Server 4.0 and up), NetWare, Solaris or SUSE Linux.

Installation was a breeze, though, Yosemite users could benefit from a way to deal with the default settings in XP-client firewall settings (we had to poke a hole in XP's firewall to let the client connect to the backup server).

Administrators and users can set up ad-hoc and scheduled backups. Yosemite doesn't encrypt data being backed up, which we find to be insecure, though data is compressed, which removes the very easiest of download-

able protocol analyzer data spying and theft compromises.

Licensing is done by tape libraries and additional tape devices mean additional licensing costs. Libraries can be easily accessed or, if online storage is preferred, libraries as large as 8TB can be maintained. Although the libraries are easily accessible and understandable in layout, there's no provision for mass client installation. The GUI provides a Windows Explorer-like view of the available files, from which users select the files they want to access and the version they want to restore.

Bare-metal restoration capabilities for Windows, NetWare and Linux platforms are available as an extra-cost option, as are other high-availability options, including modules for Exchange and Oracle.

Yosemite's product does offer some basic logging functions, and that information can be saved to a file or e-mailed. It also has a feature that lets you set up audit logs on critical file-backup procedures.

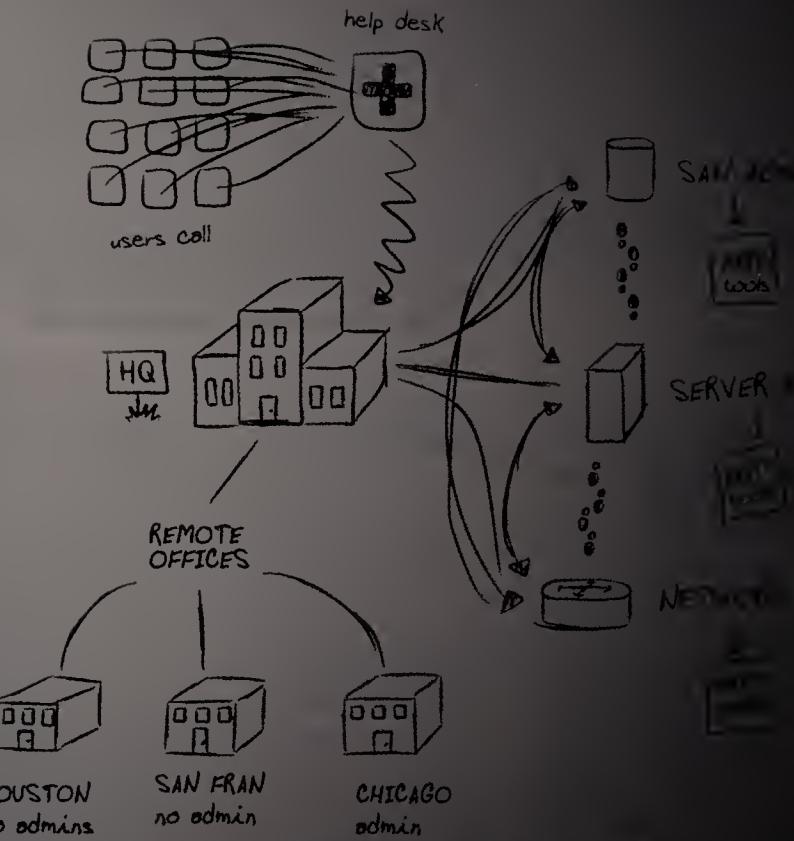
Our overall impression of Yosemite was favorable, and while its costs can be comparatively high, it easily encompasses Windows, Linux and Solaris servers and clients with an understandable management and administration console, and backups and restorations can be done by administrators or adventurous and trained users.

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Lab Alliance

■ Henderson is also a member of the Network World Lab Alliance, a cooperative of the premier testers in the network industry, each bringing to bear years of practical experience on every test. For more Lab Alliance information, including what it takes to become a partner, go to www.networkworld.com/alliance.

Other members: Mandy Andress, ArcSec; John Bass, Centennial Networking; Travis Berkley, University of Kansas; Jeffrey Fritz, University of California, San Francisco; James Gaskin, Gaskin Computing Services; Miercom, network consultancy and product test center; Christine Perey, Perey Research & Consulting; Barry Nance, independent consultant; David Newman, Network Test; Thomas Powell, PINT; Joel Snyder, Opus One; Rodney Thayer, Canola & Jones; Sam Stover, independent consultant



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CLEAR CHOICE TEST

Identity Engines enables central policy management

BY MANDY ANDRESS, NETWORK WORLD LAB ALLIANCE

Managing authentication to networks, systems and applications is an onerous task because of diverse user bases and access methods. In this Clear Choice Test, an identity-management appliance called Identity Engines' Ignition Server proved to be adept at aggregating control of multiple user repositories and devices once we got used to the somewhat cumbersome interface.

The Ignition appliance goes beyond standard authentication, authorization and auditing to include centralized policy management, user consolidation, compliance automation and distributed deployment. Ignition uses RADIUS, 802.1x and other standard protocols.

We installed the appliance in our test network using the configuration that routes all traffic through the administration interface (See "How we did it" at www.nwdocfind.com/6521). There also is the option of splitting management traffic and authentication/authorization traffic to a separate network interface. Initial setup of the appliance took less than 10 minutes.

Management is accomplished through the product's Ignition Dashboard, a thick-client console that we installed on a separate server. With the increasing movement toward Web-based management consoles, we were a little surprised to see the thick-client approach. We would prefer a Web-based management console to make distributed management a bit easier.

After logon, the Ignition appliance is selected and configured. We would like a more centralized approach to management in which we can make configuration changes and then choose which appliances to apply them to. This prevents the need to make changes multiple times to different devices in a distributed environment.

Before testing, we upgraded Ignition to the latest release, 3.2. The appliance firmware upgraded without issue. When upgrading Ignition Dashboard, the Sun Java Virtual Machine (JVM) was removed (or unlinked) and the new version could not find it. We had to manually install the JVM for the upgraded software to function correctly, though this took only a few minutes.

Devices that are secured by Ignition are called authenticators, which can be grouped into service categories. We configured our Cisco 3000 VPN Concentrator and our Fortigate appliance to use Radius authentication and then defined them as authenticators in Ignition. We created a VPN service category to group the devices together.

We had some initial difficulty performing those tasks through the Ignition Dashboard management GUI. The software is not intuitive and was confusing at times. After working with the product for a while, we became familiar with the console and understood how to get the job

done, but it has a bit of a learning curve.

Next, we set up the user repositories. For testing, we used Active Directory in conjunction with the onboard user repository contained and administered on the Ignition server. The configuration to communicate with Active Directory was very straightforward. We used the wizard and the simple Active Directory configuration within Ignition, because our Active Directory implementation is pretty standard. Ignition also offers support for SSL-encrypted communication with Active Directory, which is very nice to see.

Once we had the user repositories configured, we created a directory set, which groups disparate user stores



Identity Engines' Ignition Server is an identity management appliance that integrates with your existing directory stores.

together. We then created a virtual group, which aggregates groups across multiple directories. For testing, we created a virtual group called Admin that included the Domain Admin group from Active Directory and an Admin group we defined in the Ignition embedded user store. The ability to consolidate multiple user repositories and devices into a single point of control is a great feature that could easily stand on its own.

Once we had the devices and repositories configured, we set up our authentication policies. We started simply, configuring a policy that said anyone trying to access the network from the VPN was approved. This meant that if you came in through the Cisco Concentrator or the Fortinet device and you successfully authenticated to Active Directory or the embedded user store, wherever your account resided, you were allowed access. We tested valid and invalid accounts, and everything worked great.

To get a little more complicated, we set some conditions on the VPN service category. We required the user to be in a specific group in Active Directory, using the virtual

ID MANAGEMENT

IDENTITY ENGINES IGNITION 3.2

Identity Engines

NetResults 3.18

Prices start at \$19,000 for single unit, \$34,000 for high availability.

Pros: Quick setup, not overly complex; ability to authenticate across repositories with single configuration.

Cons: Policy could be more flexible; user interface cumbersome at times; not intuitive, but fairly easy once learned.

The Breakdown

	Policy management	35%	3.0	Scoring Key:
Device configuration	35%	3.5	5: Exceptional.	
System management	15%	3.0	4: Very good.	
Logging/reporting	15%	3.0	3: Average.	
Total score		3.18	2: Below average.	
			1: Subpar or not available.	

group we created previously. We tested multiple account scenarios based on user store and group membership and everything worked as expected.

We would like to see more detail and flexibility in the policy development. We were not able to disable a policy if we removed it from use temporarily for testing. If we needed the policy again, we had to delete it and recreate it later.

We also were not able to specify complex policy relationships. For example, we wanted to develop a policy that says if you are in an admin group or you come through a specific service category, then access is allowed. In our testing, we were only able to set an "and" policy that required both criteria to be met to get access. We would like to create embedded policy statements or more complex if/then scenarios for policy application.

Ignition also contains Ignition Jumpstart, a Web-based system for managing guest access. We installed Jumpstart and configured it to allow registered guests onto a specific virtual LAN (VLAN) on the network. Setting up the Jumpstart components was straightforward. Controlling access for guest users followed the same setup we tested for regular users. In our test configuration, guest users were assigned to a VLAN that allowed only Internet access. We could track guest registrations and what they tried to access from the network perspective.

For logging, Ignition's primary focus is syslog, but files can be exported through FTP/SFTP to a separate location. Logs are stored locally and can be viewed, but no specific reporting is available. Some statistics are provided on transactions, such as authentication attempts, but graphs or exportable reports are not included.

Ignition is definitely worth a look for any company struggling with network access control. Ignition does not require significant architecture changes and integrates easily into existing environments. While policy development could be expanded to allow for more complex scenarios, the current functionality helps solve problems that many companies do not have an answer for.

Andress is president of ArcSec Technologies, a security company focusing on product reviews and analysis. She can be reached at mandy@arcsec.com.

MANAGEMENT & CAREERS

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Before you sign on the dotted line

What to know about the documents a new employer may require you to sign

BY DEB RADCLIFF

Gone are the days of contracts that cover the terms and conditions of employees' compensation, duties, length of employment, benefits and bases for termination; and spell out the rules about noncompete agreements, confidentiality, reimbursement and grievances.

"There's always an employment contract of some kind, even if it's just 'come work for me and I'll pay you.' But formal, written contracts are the exception rather than the norm," says Robert Style, an attorney in Philadelphia in private practice and general counsel to the National Association of Personnel Service.

Even in IT, employment contracts are rare. The reason, say recruiters and temporary-staffing agents, is that all states except Montana have employment laws giving either party the right to terminate employment at will.

"Employers are loath to enter into a contract employment agreement with IT staff, even very senior-level management, because it creates an obligation on their part," says Michael Rossman, director of global IT services and information security

for spice-maker McCormick & Co. in Hunt Valley, Md. "Without a contract, benefits and provisions can be changed at will instead of having to renegotiate every time policies dictate."

That doesn't mean new hires aren't signing documents. Their signatures are on an increasing number of documents that cover everything from employee compensation and duties, to benefits agreements, noncompetes, ethical behavior (antiharassment and appropriate use policies, for example), reimbursement, grievances, and, most commonly, confidentiality and nondisclosure agreements, Rossman says. The decades-old spice recipes his company makes for brand-name food chains are a particularly competitive part of its intellectual property, so employees are asked to renew some of their nondis-

closure agreements every year.

All these types of agreements have been vetted for legality by the employer, so there's not much room for negotiation, says Joyce Brocaglia, CEO of executive IT security placement firm Alta Associates in Flemington, N.Y. Still, she strongly advises giving any contractual obligation, particularly any related to noncompetes and intellectual property, a thorough review before accepting an offer or quitting a current job.

"If you read anything that seems overly restrictive, it's always best to have an attorney who specializes in employment law review and jointly prepare suggested edits to the contract in question," she adds.

Some noncompetes are overly restrictive because they're so broad, experts say. For example, by not specifying conditions, such an agreement could prevent a software developer from ever writing code again, or could exclude an executive from working in an entire sector, says James Del Monte, president of JDA Professional Services, an IT staffing services agency in Houston.

A reasonable noncompete would limit the obligation to the company's direct competitors and for a certain period of time, Style says. With or without a contract, you should be sure to find out under what circumstances you can be fired, and what activities are restricted (common ones are sexual harassment and personal use of assets), he says.

The lack of discussion about severance packages is due to the reluctance of most companies to negotiate such packages upfront, Brocaglia says. You'll probably be signing a severance document at some time in your career, however, and you should inspect the language of the agreement carefully. For example, according to an Equal Employment Opportu-



ERIC MUELLER

nity Commission's suit against Land O'Lakes in September, the company had put in its severance documents a requirement that terminated employees waive their rights to file discrimination claims in exchange for severance pay.

In addition to noncompetes and confidentiality agreements, lost-compensation agreements are fairly common at the executive level. "The most common executive contracts that corpora-

tions are willing to negotiate involve making new executives whole for money they leave on the table by exiting their current company," Brocaglia says.

"Executives often receive contracts buying out their stock and option awards or reimbursing them for bonuses lost. They need to be sure this amount is calculated correctly and, preferably, paid upfront."

Radcliff is a freelance writer. She can be reached at deb@radcliff.com.

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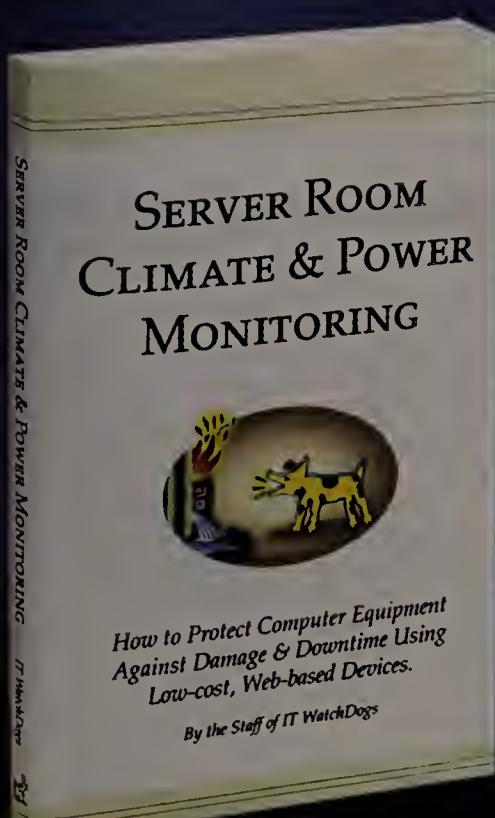


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TOLLY ON TECHNOLOGY

Kevin Tolly

Redmond vs. Red Hat: Divide and conquer

offering it support.

When the news hit, I was traveling in Asia — but it was significant enough to warrant a substantial story in the International Herald Tribune.

The story, "Microsoft and Novell sign cooperation pact on Linux", began by stating: "Microsoft has acknowledged the influence of ... Linux." It noted that Microsoft CEO Steve Ballmer said Microsoft has been getting "pressure" to make its operating system and Linux "operate together."

The quick read is that Microsoft caved in to customer demand. What a beautiful thing. But, as many analysts are pointing out, the decision to support Linux might do more to discourage customer migration than to encour-

age it. And, of course, that is just fine by Microsoft.

By backing Novell's SuSE Linux, the company executed a classic divide and conquer tactic against Red Hat.

Think about it. You want to have a Windows machine and a Linux machine in the same network operate together. They communicate using standard networking protocols. They already operate together and did so prior to the announcement. Operation is really just co-existence and that is about as complicated as you and I taking an elevator together. There is nothing special we have to do — we just coexist there until we get to our respective floors.

This is cover for the key news,

which is that Microsoft and Novell have worked out agreements regarding intellectual property rights. With its magic wand, Microsoft has created a lawsuit-free version of Linux while simultaneously reminding everyone that every other version of Linux is a potential target. And the three-year exclusive deal with Novell is going to undermine the other leading players.

If you think this won't happen, it is instructive to check out Wikipedia on SCO Group's lawsuit warpath (see www.nwdocfinder.com/6522). The company is not only going after IBM and Red Hat; it has been in litigation with DaimlerChrysler for some time.

As someone who has been involved in corporate IT buying

for a quarter of a century, it is ingrained in my psyche that I should look for the technology that will provide the maximum benefit to my company. That is no longer the case.

Unfortunately, buyers now must think about the fact that the solution they purchase might cause them to become a target in a lawsuit.

If this causes buyers to be attracted by the solution least likely to cause harm rather than those that can do them the most good, that will be a sad day indeed.

Tolly is president of The Tolly Group, a strategic consulting and independent testing company in Boca Raton, Fla. He can be reached at ktolly@tolly.com.

As we close out the year, it is instructive to ponder last month's pro-Linux announcement by Microsoft. It tells us a lot about how the company's thinking is evolving with respect to competition. And, more importantly, what that might mean to customers in the coming year.

You have to give Microsoft credit. With one announcement the company significantly undermined the enterprise Linux movement while superficially

Cisco

continued from page 1

more flexibility to allow customers to purchase software and to deploy it, according to their terms."

IOS upgrades require a reinstall of the new software image on the router or switch — which causes downtime — or, "we say, not a problem, UPS will arrive soon, here's another blade" to run your new service or application, Metzler said. "This adds months to the deployment cycle, which is not good for customers or Cisco's business."

Because IOS code releases are a superset of features in previous

versions, Metzler added, users must also go through lengthy testing processes to ensure new features don't interfere with existing network services. The most recent IOS release, for example (12.4(11)T), has 31 new features ranging from intrusion-prevention system (IPS) and VPN upgrades, to VoIP Border Gateway Protocol, load-balancing and VoiceXML features.

"What's going to happen? What else was in this software image that I just loaded?" are common questions when upgrading IOS, Metzler said. "It's not a natural, graceful way to go through a software upgrade."

The evolution of Cisco's soft-

ware model was first mentioned by CEO John Chambers in June at the company's North American customer event.

"More than half of our engineers are software engineers, yet we sell [software] like a hardware product," Chambers said.

The first phase of how this will play out involves an a la carte model for buying features and services embedded in IOS code. Metzler did not give a timetable, but hinted this would happen over the next five years.

Besides breaking IOS software away from hardware, users should also expect IOS code to run in a more modularized way.

"We've always built lots of services, integrated them into IOS, but they're not isolated from one another," Metzler said. "If one of them crashes, you have a problem with everything running there. Using virtualization techniques, you can isolate the services, so that if one of them has a problem, it doesn't impact the other ones."

Loading services onto routers this way will also allow for more centralized deployment and management. Some operational costs could be reduced or eliminated.

Features and services in IOS — such as security, VoIP or management — would run as loadable modules on top of an IOS kernel, letting users turn features on and off without bringing down a router. Also, services that run on hardware modules, such as IPS blades or VPN modules for routers

Cisco software challenges

Cisco has identified the problems with its IOS router operating system and other network software, and proposed a five-year plan to make things better.

Challenge

Cisco's IOS software is tied closely with hardware, making it hard to upgrade and manage.

Blades running specific services or applications take up room in a chassis and are difficult to deploy quickly.

Services running in IOS are tightly bundled, which sometimes forces users to run code with extra modules and services that are not used.

Strategy

IOS will be decoupled from hardware, with individual services running more like virtualized services.

Servers could be virtualized across a router or switch chassis, similar to virtualized server operating systems running separately on one server hardware platform.

While breaking IOS away from hardware, Cisco also plans to separate out the various services running in IOS, letting users choose and activate only what they need.

ware we sell today will not."

This kind of breakup could have positive and negative effects for enterprises, says Karl Rosander, IT manager for the city of Sacramento, Calif., which has Cisco routers and switches deployed across all city buildings.

"This could be an advantage in how fast I implement new services on routers across our entire network," Rosander says. "From an engineer's perspective, this might cause confusion for engineers who have studied how IOS works and are certified in managing the existing technology structure."

From an overall operations perspective, the ability to dynamically upgrade routers with new security features, for example, would be invaluable, he says. ■

Network World, 118 Turnpike Road, Southborough, MA 01772-9108, (508) 460-3333.

Periodicals postage paid at Southborough, Mass., and additional mailing offices. Posted under Canadian International Publication agreement #41321518. Network World (ISSN 0887-7661) is published weekly, except for a single combined issue for the last week in December and the first week in January by Network World, Inc., 118 Turnpike Road, Southborough, MA 01772-9108.

Network World is distributed free of charge in the U.S. to qualified management or professionals.

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BACKSPIN Mark Gibbs

50 unfestive things

I am not dreaming of a white Christmas. I do not want my two front teeth, and I do not want to walk in a winter wonderland.

"Why should that be?" you may ask. "Why would the season of peace on earth and goodwill to all men not suck you in and spit you out covered in tinsel and bonhomie?"

Let me count the ways ...

I have lots of important stuff to get done (1) and with Christmas just around the corner (2) there's not much time to get it done (3), so anything that slows me down is just a pain in the festive tush (4).

Why do the voices that prompt you in voice mail (5) speak so laboriously (6)? I'm sure that anyone on lithium has a fine time with these systems, but for us very busy people this is enough to turn us into raving lunatics.

Come on, come on, what time was the darn message sent (couldn't they tell you that before replaying the message (7)?). Is it a five for the envelope details or a six (8) ... I'll press six. "You ... have ... pressed ... an invalid ... key (9). Press zero ... to return ... to the main menu."

%*!&\$. Sounds like William Shatner on valium.

Then I had a call to make. How come some companies have no operator (10) but their interactive voice response system implies that one could be available (11). "Enter the

extension you want or hit zero for assistance" ... (you enter zero) ... "Hi. This is Betty in accounts, please leave your ..." (12).

Better yet, "Enter the extension you want or hit zero for assistance" ... (you enter zero) ... "Enter the extension you want at any time otherwise hit zero ..." (13).

The best? "Enter the extension you want at any time, otherwise hit zero for assistance" ... (you enter zero) ... "Sorry, that isn't a valid extension. Goodbye" (14).

Another call to make. "Please wait." There's music on hold (15). Why can't I press some key to switch it off (16)? Is that too much to ask? Being on hold is bad enough, but being on hold and having to listen to family Christmas favorites (17) played by the Boston Pops (18) for 20 minutes (19) is worse than dentistry without Novocain.

I finish my calls and now I'm out running errands. My cell phone drops calls (20). We were with Cingular, which claims the lowest number of dropped calls. Not in my universe (21). Now we are with T-Mobile. Is T-Mobile better? I think so — when you can get a signal (22).

Back to the office, and we have everybody's favorite to deal with: Winrot (23). For the second time this year my main Windows PC is showing all the signs of needing a complete operating system (24) and applications rebuild (25). I sit down and find that CCAPP, the Symantec anti-virus user session service, is permanently hogging more

than 80% of the processor (26). Nothing else is getting anywhere (27). Kill CCAPP? Can't do it (28), it runs protected. Reboot (29).

Oh, now my G5 Mac running OS X is acting up (30). Again (31). Every now and then the cinema display blanks for no reason (32), then turns back on (33), then blanks (34), then ... (35). Everything is up to date, no faults detected, no clues at all (36).

OK, Windows rebooted — why does it take so long (37)? No! Outlook crashed (38). Great, start it up again and now it has to check its message store (39), which will take at least 10 minutes (40), which I haven't got (41), because I am busy, busy, busy (42).

Oh great, Outlook is retrieving a couple hundred messages. What a surprise! I have more newsletters I didn't subscribe to (43) and don't want (44). Loads of penny stock spam (45). Lots of e-mail addressed to "Fernando Hitsman" (46), and still more that start with phrases such as "Dearest One / With respect and humanity, I decided to send this proposal to you ..." (47).

That's it! I'm not going to get anything done so I might as well give up (48) and enjoy Christmas, because once it's over I'm going to be dealing with this mess all over again (49). Merry Christmas (50).

Bah humbug to backspin@gibbs.com.



NETBUZZ

News, insights and oddities

U.S. Postal Service delivers holiday . . . spam?

Paul McNamara

The U.S. Postal Service is promoting its online Click-N-Ship product by sending spam to customers — in apparent violation of its loophole-ridden privacy policy

and certainly the spirit of federal law — according to a pair of antispam activists who say they have received the unsolicited e-mail.

John Levine, a consultant, author and holder of leadership positions in various anti-spam organizations, reports on his blog: "The message did not have the postal mailing address of the sender (pretty ironic, huh?) nor opt-out instructions, both of which are mandatory under CAN SPAM. Did the USPS break the law?"

Paul Hoffman, director of the VPN Consortium and an IETF regular, says he received the same spam. "Regardless of whether or not it was legal, it is bad business, and it turns off orders of magnitude more customers than it attracts," he says. "Whoever at USPS organized this mailing should be summarily fired."

The Postal Service has yet to return my phone call asking for comment, but here's what its Web site says about privacy: "If you are a consumer, we use an opt-in standard. If you have provided personal information to register for or purchase a product or service, we will not use that information to contact you in the future about another product or service unless you have provided express consent. . . . If you are a business, we use an opt-out standard."

Hoffman says he used a personal e-mail address.

Lumps of coal all around for those responsible.

Better than a dating service for the single IT guy?

Subject line of the e-mail in my in-box: Special membership offer from WITI.

The acronym didn't register immediately, so I opened it up to take a look:

"Dear Paul: When I started WITI in 1989, I had four objectives: 1. Advancing women by providing direct access to a global network of professional, tech-savvy women committed to collaboration, not competition; 2. Transforming corporate environments to

level the playing field for women; 3. Increasing the number of women at top executive levels; and, 4. Encouraging girls to select careers in technology."

Admirable goals all — but, me? A member of Women in Technology International?

Perhaps there was some mistake; maybe the e-mail was intended for a Paula McNamara, not Paul (it's happened).

The e-mail continues: "WITI is totally committed to helping you succeed at every level. . . . The only thing we ask of you is to show up. We offer a supportive, woman-rich environment to help you break through to the next level."

So I went to the organization's Web site looking for a sign that men are indeed welcome, and while it took some searching, there it was buried deep within the About WITI section under WITI demographics.

Gender Breakdown: Female: 94.2%; Male: 5.8%.

First thought: Yes, men can join. Second thought: They aren't kidding about the "woman-rich environment" — that's just shy of 20-to-1 one by my reckoning.

It gets better, at least if you're the type of man who enjoys interacting with smart, successful women in both professional and perhaps personal settings: four in 10 WITI members hold advanced educational degrees, about half own their own businesses or hold executive positions . . . and an equal number earn six-figure salaries.

Now I know what some of you are thinking: How dare this cad turn something as serious and important as WITI into just another excuse to make advances?

Try not to judge me so harshly. For one thing, I'm a happily married father of three who's not joining anything any time soon except maybe the PTA. And I am quite certain that the 5.8% of the WITI membership that is male had nothing but the purest of professional motivations for joining.

I'm just saying . . . if you're a single IT guy . . . and you're looking for a professional organization to join to round out the resume . . . you could do a lot worse.

Other invites to buzz@nww.com.

INFRASTRUCTURE LOG

DAY 27: These compliance regulations are killing us! Audits. Inconsistencies. Processes. Time. Money. I feel like I'm being chased by regulators.

Oh, wait. I am being chased by regulators. Run!!!!

DAY 28: I've got it: IBM Tivoli middleware. It automates system administration to standardize compliance policies. It centralizes processes to minimize the headaches of new and ever-changing regulations. And it helps pinpoint security issues before they become problems and maintains business integrity.

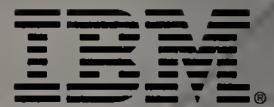
Gil is bummed we had to ditch the high-carb diet.

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Better manage the business of I.T. at:
IBM.COM/TAKEBACKCONTROL/COMPLIANCE



_INFRASTRUCTURE LOG

_DAY 35: Whoa! Came in today and found a black hole. Information goes in but doesn't come out. This is bad.

_DAY 36: The black hole just sucked in three interns. HR is not pleased.

_DAY 38: I've taken back control with IBM Information Management middleware. It's built on open standards. Totally scalable. Seamlessly unites all our critical information, whatever its source. Now our info has real business value that can help spur growth.

_We got everything back from the black hole. Except the interns.

Information Management

See innovative IBM Info Management solutions in action:
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